# THE FOUNDRY

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## Some Physical Characteristics of Molding Sands.

BY ARTHUR J. MORSE.

HAVING had occasion to make some investigations on the subject of molding sands, for the Michigan-Peninsular Car Company of this city, data have been collected which it is thought might prove of interest to practical foundrymen and others.

This preliminary paper is offered for the purpose of ascertaining whether the subject would be so considered, in which case we shall be glad to furnish further details, and enter more fully into the discussion of both the physical and chemical character of molding sands in a future paper.

In starting our investigations, the main object in view at the time was to try to discover why some of the most expensive sands were so superior to others, and just what it was about them that gave them their peculiar qualities. We began by making chemical analyses of the different sands, which gave us only the information that most of the sands which were in use at the foundry were very much alike in chemical composition, with the exception of the relative percentages of silica and alumina, which varied according as the sand was a "heavy" or "light" sand containing much or little clay, clay being a silicate of alumina, a heavy sand would of course contain more alumina than a light sand.

It was evident that the value of a sand depended largely on its physical characteristics, provided its chemical composition fell within certain limits. It seemed to be due to a nice adjustment of the relative proportions of coarse and fine sand and clay, and to the eveness of the grain, etc. So we separated each sand, by a process which we will not here stop to describe, into four different parts, weighing each part, and estimating the percentage of it in the sand.

The first consists of the coarsest grains, the second of the grains of rather fine sand, the third of the very finest grains and the fourth of the clay. Each of the first three portions are burned, and the loss of weight from each being added together gives us the percentage of vegetable or other organic and volatile matter in the sand. It is often advisable also to estimate the amount of oxide of iron—that which gives the sand its red or yellow color—although its amount is often sufficiently well indicated by the depth of color.

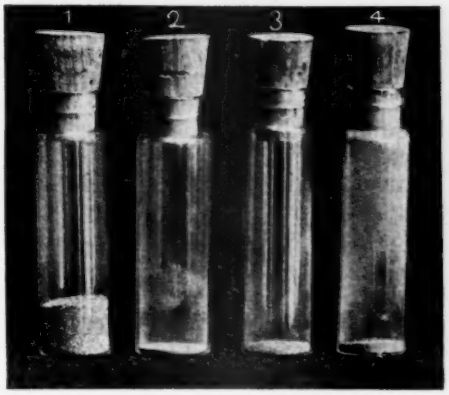



Fig 1. Sand A.

Of course, any such method of examination as that indicated above must be regarded as purely relative. A sand of known excellence and molding qualities having been examined as described, and certain results obtained, any other sand which may be examined as to its fitness for the same class of work, may be considered as being either a better or worse sand for that purpose, according as it shows the peculiar qualities of the first sand in a greater or lesser degree.

An analysis of a sand having been completed then we have: the percentage of coarse sand, which we will call No. 1; of fine sand, No. 2; of very fine sand, No. 3; of clay, No. 4; of organic and volatile matter, and of oxide of iron.

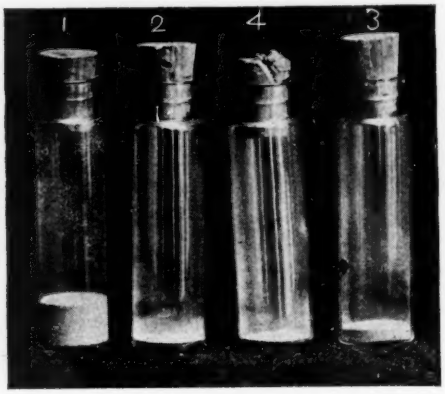



Fig. 2. Sand B.

The sand which we took as a standard for a molding sand of medium strength, for ordinary sized iron castings, has the reputation of being one of the best of all-round molding sands in the United States.

Our analysis of this sand is as follows:

No. 1, 81.91%
No. 2, 3.00%
No. 3, 6.02%
No. 4, 9.07%
Total volatile and combustible matter, 1.14%.
Iron oxide, 5.28%.

This sand is shown in the four bottles under Fig. 1, (Sand A) separated into the different parts and each part placed in a "pill bottle" for reference.

Notice that No. 1 bottle, (fig 1) shows the coarser grains form a very large percentage of this sand, and under the glass these grains are seen to be of a very uniform size. This gives the sand great porosity, while the percentage of No. 4 shows it to contain just sufficient clay to give it the necessary binding properties and prevent it from washing in the mold. Notice that the amount of organic and volatile matter is low. This material is commonly present as minute fibrous roots, pieces of bark, etc., and besides its undesirable influence in causing the sand to burn out more quickly, it forms gases where it is heated by the molten metal, and also indicates that vegetable matter may be present, which might germinate or "sprout" in molds which were allowed to stand for some time, as in small foundries, and perhaps break down parts of the mold.

A moderate amount of iron oxide seems to be desirable, enabling a sand to last longer and to better resist the washing tendencies of a stream of metal, probably by partially fusing with the silica, where the metal comes in contact with it, and thus forming a more coherent surface.

Now for another analysis. Following is an analysis of a sand which quite closely resembles the one already described, but is inferior to it:

SAND D.

No. 1, 73.45%
No. 2, 2.38%
No. 3, 14.07%
No. 4, 9.85%
Organic and volatile, 1.91%
Iron oxide, 3.84%

Compare with the first analysis, and when we tell you that the grains of sand in No. 1 of this sample are seen to be quite uneven in size, no remarks are necessary to perceive where the difference in the two sands lies.

Fig. 3. Sand C.

Following is an analysis of a "light

sand" of ordinary quality, rather deficient in strength:

| | |
|---|---|
| No. 1, | 71.77% |
| No. 2, | 4.46% |
| No. 3, | 18.78% |
| No. 4, | 5.00% |
| Organic and volatile, | 2.55% |
| Iron oxide, | 2.35%. |

This sand is shown in Fig. 2. The third and fourth bottles in the illustration are, by a mistake, placed in the wrong order, but the numbers show where they belong.

Fig. 3 shows a "heavy sand" of good quality. Notice the larger size of the grains in the first bottle, and the large amount of clay, as shown in the last, the clay giving it great strength, while the larger size of the sand grains give it the greater porosity necessary where so much clay is present.

Following is the analysis:

| | |
|---|---|
| No. 1, | 64.01% |
| No. 2, | 2.16% |
| No. 3, | 8.45% |
| No. 4, | 24.00% |
| Organic and volatile, | .80% |
| Iron oxide, | 5.40% |

The iron oxide, by the way, is included with the 1, 2, 3, and 4 percentages given in these analyses, part of it coloring the grains of sand, while a large part of it goes in and is calculated with the clay.

Notice the small percentage of organic matter in the last analysis. It seems to be quite a general rule that the more clay a sand contains, the less organic matter. We suppose it is because the sand lying near the surface, and naturally containing considerable vegetable matter, has had the clay washed out of it and deposited deeper down with the coarser sand, thus forming a "heavy sand" containing little or no vegetable matter. Fig. 4 is an attempt to give a better idea of the grain of the No. 1 bottles in sands A, B and C.

Sand A which was stronger than sand C, contained less clay, but a large amount of oxide of iron, giving it a dark red color.

One foundry in the city uses it for molding car wheels, but another complains that it is too strong, and "bakes" on the wheels, undoubtedly due to the large amount of iron oxide.

Following are two analyses made of this sand, on shipments nearly two years apart:

SAND E. (1)

| | |
|---|---|
| No. 1, | 56.63% |
| No. 2, | 2.31% |
| No. 3, | 25.38% |
| No. 4, | 15.68% |
| Organic and volatile, | 1.31% |

Iron oxide, not determined, but large amount evidently present.

SAND E. (2)

| | |
|---|---|
| No. 1, | 67.66% |
| No. 2, | 2.41% |
| No. 3, | 13.60% |
| No. 4, | 16.33% |
| Organic and volatile, | 1.72% |

Iron oxide, as above.

A light sand composed of very uniform fine grains, but graded in a rather peculiar manner, is

SAND F.

| | |
|---|---|
| No. 1, | 44.42% |
| No. 2, | 35.14% |
| No. 3, | 10.59% |
| No. 4, | 9.85% |
| Organic and volatile, | 1.10% |
| Iron oxide, | 3.31% |

This sand contains a good deal of clay and might be diluted with advantage by a sand of the following composition:

SAND G.

| | |
|---|---|
| No. 1, | 70.20% |
| No. 2, | 19.16% |
| No. 3, | 8.05% |
| No. 4, | 2.59% |
| Organic and volatile, | .81% |

We have analyzed sands which were of a texture fine enough for light work, but containing enough clayey material for a heavy sand, and vice versa, "heavy sands" which were only lacking in the most essential element of clay. Such sands as these are sometimes "doctored" either by mixing them with other sands or by adding the constituents in which they are lacking, such as clay or sharp sand. Especially we believe this is practiced in Germany. In "Iron and Steel Manufacture," a volume by F. Kohn, it is stated that the very delicate Berlin castings are molded in artificial sand. In making this sand it is aimed to get a maximum porosity with a very fine grain. A folded napkin was molded and showed every thread. The same volume states that M. Schott experimented on the porosity of different kinds of sandstone by soaking them in water and then

measuring the absorbed water. The most porous were then ground for the manufacture of molding sand. Kohn goes on to state the limits of chemical composition allowable in a good molding sand; statements with which we do not agree, but lack of space prevents further discussion of this interesting branch of the subject at present. We will simply give our chemical analysis of sands A and D, and an analysis said to have been made by another chemist, A. S. Bertholet, of another sample of the same sand as A, taken ten years ago.

| | SAND A. | BERTHOLET'S ANALYSIS. |
|---|---|---|
| Silica, | 77.07% | 80.99% |
| Iron oxide, | 5.28% | 3.92% |
| Alumina, | 11.35% | 9.49% |
| Lime, | 1.12% | .61% |
| Loss on ignition, or organic and volatile, | 2.88% | Not determined. |

Remainder, Manganese and magnesia not determined.

| SAND D. | |
|---|---|
| Silica, | 81.25% |
| Iron oxide, | 3.84% |
| Alumina, | 8.97% |
| Lime, | 1.42% |
| Loss on ignition, | 2.69% |

The reason that the organic and volatile matter is higher in the chemical analysis than in the physical analysis is that in the latter the loss on burning the No. 4, or clay, is not estimated, as the loss there would be almost entirely due to driving off the water which is chemically combined with the clay and gives it its plasticity. It is the gradual expulsion of this water in the mold by the heat of the iron, which causes the sand to lose its plasticity after a time, and become "burned out."

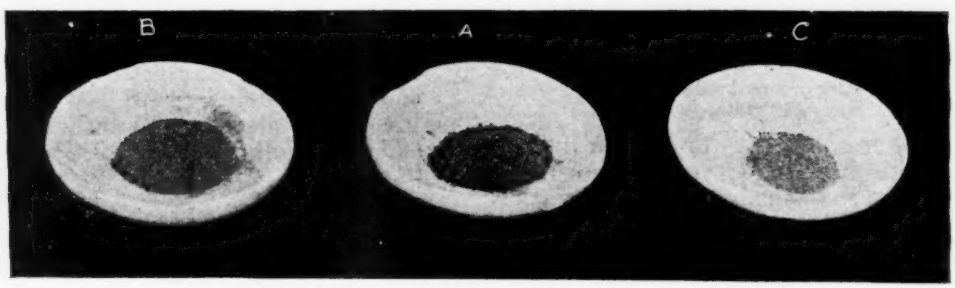



Figure 4.

## The Foundry at the Fair.

BY THOS. D. WEST.

PRAISE and admiration for achievements in mechanical lines could be heard and noticed for most every industry but the foundry; and during the period of sixteen days which the writer was at the Fair, not once did he hear any one enthusiastically compliment or sensibly refer to founding.

One might hear some person venture the opinion, "It's a big thing," "What is that bent that way for?" etc.; but, how was that cast to obtain such a smooth, perfect body?; is that not a finely proportioned piece of work? etc., were elements which might have been in some minds that, from enthusiasm being absorbed in other fields, failed to express them.

As foundrymen we must of course admit there was nothing at the Fair illustrating progress and inciting admiration for founding, as in the science of electricity, which, figuratively speaking, had its birth at the Centennial, 1876, and grew to such magnitude that all could not but be amazed as they stood in the electrical building and beheld its achievements and rapid growth, and I question if one out of a thousand, leaving that wonder of the nineteenth century, ever gave the foundry a thought, mainly through admiration and a desire to applaud the credit due to electricians that today the whole world stands awed at and wonders what will be done next; especially after having seen iron welded by electricity and melted in a pail of water; which, by the way, must have

caused many to carry away ideas and thought for further investigation and a study of melting by electricity, and by the time of the next World's Fair at Paris, 1900, who dare say, such would not be common practice and have replaced present methods.

Most men, no doubt, left the Electrical building with their minds all absorbed with the wonders of electricity, but a few must have noticed the complex shapes and extra fine workmanship of many castings constituting the machines the electrician was dependent upon to assist him in obtaining his electrical results, and will be forced to acknowledge that the workmanship therein displayed was, a few years back, seldom to be seen, or more the exception to the rule than by far is the case today, and again in this line, but few have any knowledge of what is truly the best kind of mixture in iron for offering the least resistence to electrical currents. Many costly machines have been completed and then found defective in their power, owing to the metal not being of right character.

The casting of electrical work is a specialty to a degree, like chilled rolls, and the former often proves expensive work for an inexperienced founder to undertake, and is justly entitled to some credit as advancing the art of founding, and can be said to embrace America's product as much, if not more than any other line of foundry exhibits seen at the Fair.

The next to, and without doubt the most interesting to the founder, can be well said to be the mines and Mining building, and to an observant mind, about one of the first factors to make an impression is the inroads pressed and rolled shapes of wrought and steel metals are making into cast forms. Here and there could be seen forms of piping and ornamental work thought a few years back impossible to be obtained by any other process than pouring of metal into molds.

In this same section of the building one is struck with an exhibit of small statuary of men and animals posed in different attitudes and groups of most all descriptions; also intricate designs, all made of cast iron. The molders that are so proud of referring to some of their friends as having cast a cup and saucer with spoon combined, would forever hold their praise of such, could they only realize or have a knowledge of the character of this display, and at what a reasonable price the castings could be purchased.

Certainly no founder could notice this exhibit without complimenting the workmanship and skill there shown. The only thing to be regretted is, we cannot say that either of these two last exhibits were of America; the first being of Stumm, of Germany, and the latter in statuary of Russian manufacture.

Also in the same building, any founder desirous of obtaining a knowledge of ores from which cast iron is made, could find material for a year's study. The complete model of the Calumet stamping crusher with their buildings and appliances; also Fraser & Chalmer's exhibit of heavy machinery in actual operation, was very interesting in showing the founder the complete processes of stamping and crushing ores.

Passing from this exhibit up to the gallery the founder could not be but attracted by the exhibit of the H C. Frick Coke Co., illustrating upon a very elaborate scale by working models the actual operation gone through in taking coal from the mines, dumping it into the ovens, burning it, taking it out as coke and loading into cars ready for shipping. To the founder who has never had the opportunity of seeing coke being made, this exhibit must have been quite a treat. Here the founder could be well impressed with the manipulation of coke burning or manufacture, and also more fully comprehend the difference between furnace and foundry coke, and which means the former is coal only burnt forty-eight hours, where the latter is burnt for seventy-two hours and generally takes place during Sunday, or one day out of seven—that one which the oven fillers take for a day of rest or pleasure.

Leaving the coke exhibit, one soon finds himself observing "The first casting made in America," cast at the Saugus Iron Works, 1642. It was mounted

on an elegant pedestal, suspended in a neat glass case, in the rear of which was a cast iron plate with letters descriptive of the casting and its history, and which, by the way, was a very creditable piece of workmanship, but as I stood and looked at that old pot or kettle and then read the words: "The first casting made in America," about the first thought that entered my mind was to doubt the correctness of such a statement. It did seem to me that something more simple or less complex would have had to be the "first casting made." If the sign had read: "The first achievement in casting," I am satisfied my mind would not have run off into the channel it did.

Take it any way one might, it is a very creditable piece of work for early founding, and is a job that today many hiring out as molders, would have about such a time making it as the story goes of the molder making five castings to get one good one, and when called to account for his ill success excused himself by saying, "Well, that one 'ran out,' that one 'blowed,'that 'flopped,' and that's a 'waster'; any molder is liable to have bad luck sometimes; give a man a chance, can't you?"

The section in which this ancient casting was shown, contained numerous large show cases well filled with samples, showing the fracture of all kinds of pig metal that a founder could wish to have any knowledge of. They certainly were a valuable collection, and would well pay any one for all the time he could devote to a study of them.

Also in this part of the gallery exhibit could be seen the new principle used for smelting aluminum from its ore. The furnace was shown as when used in actual operation, and only the founder that has tried to derive benefit from aluminum as an alloy, is in any shape to fully realize the value of this new principle of extracting aluminum.

The writer had quite an experience with this metal when it was first introduced. Many times have I seen a pot of bronze being labored with in the furnace from five to ten hours trying to bring it to some required grade. The aluminum then used was alloyed with iron and copper, and the percentage of aluminum contained was guess work.

I often said if a fellow could only have the pure aluminum, then he would know just what to do, and what percentage to use to give the desired results in any alloy, and not until such could be obtained would aluminum be able to create an industry for its product, but with this late improvement, which is controlled by the Pittsburg Reduction Co., we may rest assured aluminum is going to come more to the front, so that by the time of the next world's fair many may be surprised at its importance, and the various novelties and new fields of manufacture it will have given to the industry of the world.

Closely adjoining this exhibit was one to be seen given by the Passaic Art Casting Co., of Passaic, N. J. The work produced by this company's processes is such as to surpass anything seen at the Fair for the perfection and beauty in the line of perfect, small ornamental and figured castings. This company guarantees its work to be an exact duplicate of the pattern. The more perfect such are made, so are the castings produced. One could not look at their exhibit without realizing that founding had truly made advances.

There are other interesting features in this building that could be mentioned, but, as before we get through with all the buildings, too much space will be taken, we will press on and pass to the Machinery hall.

Here work of the founder stands out in bolder relief than in any other of the buildings. It might almost be said to be all foundry with a little cleaning and brushing up to appear at its best. Especially was this impression conveyed as the musical tones of the cornet caused ones eyes to raise and behold a fifty-ton traveling crane made by the Yale & Towne Co., gracefully gliding from one end to the other of this long building, loaded with human freight viewing the thousands of intricate forms of machinery mainly made from cast iron. Yet while this building contains chiefly the product of the foundry, here and there tangled up with a leather belt to make a show of life, how

many gave the foundry a passing thought? A few might have done so while viewing the monster planer, exhibited by the Niles Tool Works, the total weight of which was 150 tons. The table itself, the largest single casting about the machine, weighs 35 tons. It will plane a piece of work 12 ft. wide, 30 ft. long by 6 ft. high. In a critical examination of the castings comprising the machine to be seen in all parts of the building, one could not but admit they displayed good workmanship and progress in the art of machinery molding, for many small and large castings difficult to obtain could be found presenting perfect work.

On the whole the founder had nothing to be ashamed of in all that mammoth exhibition of machinery formed of cast iron and steel, here and there mixed in with or burnished over with a little brass, bronze, nickel or silver to dress it up to look its best, which made it so fine appearing that it could not be recognized as having any relationship to pig iron or a sand pile.

By the way, I came very nearly overlooking the molding department at the World's Fair. I am excusable for that, for with most all it is second nature to past usage to give very little attention to molding shops.

There had, however, to be one and by the aid of several ambitious guides, I found it located in a very obscure part of the building as a side issue, crowded to one corner upon a raised platform and on which journal boxes were being moulded by "The Tabor Molding Machine." Here a fellow with elegant white cuffs and a polished shirt, laboring to make 300 molds per day and never having a "drop-out," impressed me seriously with the dignity of labor, and I could not but compliment the sand-pusher in some ways, for I did not see one "run-out" or "blow-up." This, however, was due to the work not being poured with that mold tester, hot iron, for as fast as they were made he would get the visitors to push their fingers through them to see how correctly the machine would ram in making it hard or soft where such was necessary to give a good casting true to the pattern.

After obtaining the information that the fellow did not have a card and thought it not necessary, I reluctantly left him to his fate, wondering if the next world's fair in America would not excel this exhibit of a molding shop. Feeling much better from having had a "whiff of a foundry," I very ably transported myself over into the transportation building.

The first thing to attract my attention was the ponderous upright steam hammer of the Bethlehem Iron Works exhibit, and as I stood off at a distance admiring its massiveness and thinking how sensible it was to construct such ponderous machines in sections and bolt them together instead of casting them in 100-ton chunks, somebody passed me remarking to a friend, "That's not iron; it's a wooden structure." I rapidly approached the monster and, sure enough, I found the stranger's statement to be true.

Instantly I seemed to lose all interest in any further examination of the machine, exactly why I cannot explain, but I am inclined to think it due to that innate feeling all machinery molders possess which leads them to respect a heavy piece of work. There is something about such that leads the mind to think of the thousand and one chances to run the molder had when making the casting, of having a "blow-up," burst-out," or a glorious "explosion."

Then, again, what enjoyment and satisfaction could a molder take in ferreting out "scabs" and "blow-holes" in a wooden model? Had it been the real thing, I would not have gone away from it for an hour, but as soon as I discovered it was wood I passed on thinking if ever I got a chance I would go and see the original, for it could not but be a credit to its builders.

Close by this monument erected to display the molders' art, one could not help noticing a magnificent exhibit of large cannon and other cast forms highly finished, of which the closest inspection could not discover a flaw; all the product of the same firm that erected the monster hammer.

As in all the other buildings, there are many more exhibits that could be

and are worthy of comment, but as I am already taking too much space, we will adjourn from here over to the Krupp exhibit. Here one sees the 125-ton gun mounted ready for action, and at 11:45 each day was operated to show that its movements could be handled as easily and at will as the pen with which this article is written, and nowhere among all the World's Fair exhibitors of heavy work, can be found more perfect workmanship in the founder's art than was displayed in the hundred and one different specimens of castings to be seen in the Krupp building. It seriously showed us American iron and steel founders that Europe was not asleep, and we will have to look out sharply for our laurels. The exhibit was certainly a credit to Germany.

Having never had the opportunity to labor in or visit European countries, I cannot from experience say if the sample of work exhibited by foreign nations was such as is their ordinary common production or not, but I do know this much that in most cases our manufacturers made no effort to present other than ordinary work. There is one firm I could mention which it might almost be said, made their exhibit from a scrap pile, and the only reason I can attribute to the indifference shown by some to make a special effort is, they thought they "didn't have to," as their goods were well known the world over to be A No. 1 in every particular.

Being now very near the Agricultural building, I thought I would step in and see what the founder had there worthy of attention, but the glitter of the high finish and the wondrous crooks and turns the castings most all had alarmed me lest my eyesight might get paralyzed if I tried to follow them, and clearly seeing they were holding their own in the race, I left the building and following a crowd, soon found myself in the mechanics' liberal art building, and with my eyes fixed skyward trying to give them a rest, their focus soon brought my vision to bear on the Yerkes telescope, presented by Yerkes to Chicago, and erected by Warner & Swasey, the world-wide known builders of telescopes.

My first impulse was to climb the grand stairway and take a peep at old Sol, but noticing the mammoth foundation was not of wood, but of the real old stuff, cast iron, a peep at the sun lost all charms, and what time I could devote to inspection was all given to an admiration of the perfect workmanship and accuracy of detail displayed in a machine that calls for as high skill as is required in the mechanical arts. I was filled with admiration of the wonders that such a powerful telescope could reveal, and recognized that Yerkes appreciated the necessity of having something extraordinary powerful to induce Chicagoans to look heavenward.

Feeling he had spiritually realized Chicago's greatest need, I elbowed my way to examine the large statue of Columbus cast by a Chicago firm, the name of which I cannot now recall. It was a true artistic American production, and although not up to the clean-cut work of the Italian exhibit of statuary, it showed very creditable work for our young country.

Leaving this life-like statue, I soon found my attention riveted to the exhibit of the Michigan Stove Co., and although I was again confronted with a gigantic wooden model, this time a stove covering one-quarter of an acre, more or less, and nearly as high as Yerkes telescope, my sight quickly detected it was used only as a roof to cover and protect a collossal collection of samples, comprising all the different characters of stoves made by this firm and one that was not, it being the oldest stove in America. the thickness of its plates being from one-half to three-quarters of an inch. This stove was brought from France and placed in the first established convent in 1693, and loaned by the courtesy of Mr. Chas. F. Gunther, and in many ways it showed the progress made in the art of stove molding, standing as it did in contrast to the ornamental, well-proportioned and elegantly mounted modern stoves there on exhibition.

There are none that viewed this exhibition but what would be forced to admit that the stove founders' art had ad-

vanced to a surprising degree during the last ten years. There might be something said as to what elements our progress in founding is mainly due, and could we thus continue calling attention to progress and achievements in founding as exhibited at the World's Fair to a much greater length, and founders must admit that if visitors did not generally fully recognize the importance of foundry work, the managers of the Fair did so, as is fully shown by the results of their solicitations and the excellent facilities and opportunities they afforded for its display, and now, after a study of the subject I am vain enough to think there was considerable of the foundry at the Fair after all, and many industries would have failed to gain glory for their achievement had it not been for the founders assistance.

I know we are a little late in coming out to "blow our horn," but as the foundry is looked on as always being behind, the late appearance of this article will no doubt be taken by many as "right in line" and harmony with our progress.

As this article is written wholly from memory, having no idea at the time of my visit of preparing any paper treating upon the foundry display, any are at liberty to "call me down" if I have incorrectly or too strongly drawn upon imagination in my enthusiasm to uphold the rights and interests of "The foundry at the Fair."

## Other Ways of Accounting For It.

BY HENRY HANSEN.

OFTEN when a casting is lost, various theories are advanced for its being so, and it is no uncommon occurrence for a molder to try and make himself believe something which he knows is not so, simply because it eases his mind for the time being.

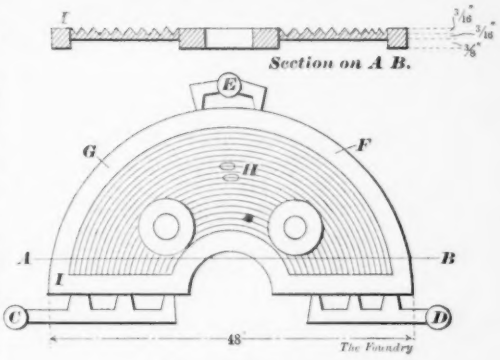
The writer has lost a good many castings during his time in the foundry, and the probabilities are that they will continue to pile up for some years yet, but I have always tried to find the true cause and thus prevent a second occurrence.

Some years ago I was employed in the Union Iron Works in San Francisco, and among the jobs I got while there was a very plain casting, a floor plate, shown in cut.

The casting was gated as shown at C and D, with a riser at E to take off the "strain," as molders call it. It was found not to have run at a couple of light places, as shown at H, and as we were always furnished with good hot iron there was no excuse accepted for a piece not running. The foreman asked me how I poured it, to which I replied, "With two ladles." Take three next time," was his answer.

I then gated it at C, D and E, with risers at F and G, but to our surprise, the casting appeared like the first one, with the same places not run at H.

Then everybody argued the points




connected with molding such a piece. Some said the iron was certainly not good; others, that the pattern was made wrong, etc., etc.

I could not keep from thinking about my failure to produce a perfect casting, and by studying the shape of the pattern as seen at sectional cut, I observed that all gates and risers were placed on the heaviest part, I, and the whole trouble lay in the fact that the iron ran where it found the least resistence, and as it was easier for it to follow the flange I around and escape through the risers than to run in the light grooves at H, it naturally followed that course.

The next time I made it I simply gated it at C and D, with no risers whatever, poured it with two ladles, as I had done in the first place, and had the satisfaction of having a casting that was perfect in every respect, but

ever since then have I avoided placing risers on castings having light and heavy parts mixed together, for I am sure that a riser has very often caused a casting not to run by taking away the pressure which exists when pouring gates alone are used.

## A Convenient Rigging for Casting Rolls.

BY "MICHIGAN."

THERE is probably nothing in the molding line that entails greater expense than to properly equip a foundry for the manufacture of chilled rolls. These rolls are made for so many purposes and vary so much in size as to compel the expenditure of thousands of dollars in rigging by the firms making a specialty in this line, and anything which can lessen this cost must be of mutual benefit alike to the manufacturer and consumer. For every diameter of roll a chill must be had, and these chills, aside from the great expense in making, boring and facing off ends, are often a source of annoyance in getting out of the way when not in use, owing to their bulk and weight. A certain firm in Ohio make a specialty in this line, and when they first started they made chills for every length of roll for which they could get an order, until it began to look as if the whole shop would be filled with chills. One customer would come and want a 16″ roll 20″ long, another would want the same size of roll 24″ long, while still another wanted it 30″ long, and this demand for different lengths of nearly all sizes set the firm to thinking. About this time there was a plan published in some mechanical paper, for preventing the difficulty of upper neck cracking, caused by the vertical contraction of the roll in cooling. This plan, which was original I believe with John E. Parker, of Beloit, Wis., the firm saw could be turned to good service in making different lengths of rolls by making the chill long enough to meet all requirements. Mr. Parker's plan, however, required different lengths of blocks and bolts for every length of roll, and so the firm discarded that part of the plan altogether and devised a method of attaching the sleeve to their own regular rigging, which required no bolts or blocks, and on which the regular clamps could be used. Fig. 1 is a sectional view of their regular rig. Fig. 2 is a sectional view of chill with plan of

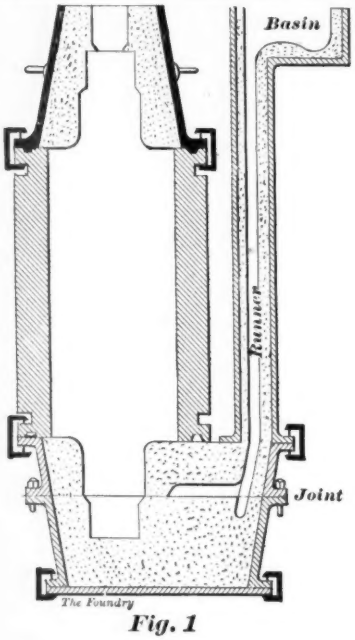



*Fig. 1*

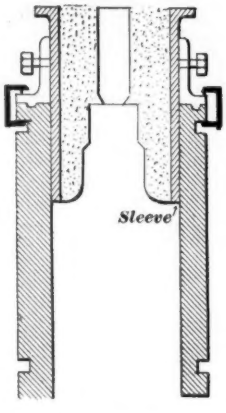



*Fig. 2*

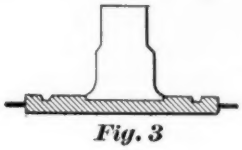


*Fig. 3*

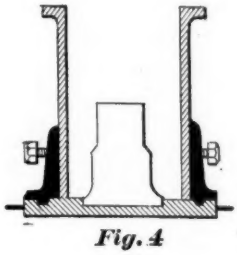


*Fig. 4*

sleeve and sleeve clamp used in shortening the roll. Fig. 3 is a sectional view of mold board with pattern of neck and wabbler attached. Fig. 4 shows mold board, neck, sleeve and sleeve clamp set all ready to ram. The sleeve is made about $\frac{3}{4}$ of an inch thick and long enough to enter the chill far enough to make the shortest roll required. It is turned up true on the ends and outside so as to neatly fit both the chill and sleeve clamp, and has a flange around the top end for lifting purposes. The sleeve clamp is made about twelve inches long and has an internal diameter of the same dimensions as the chill, while its lower end is faced off and finished with a projection exactly equal to the projection shown in both the chill and mold board, and which is always a guide in placing the sleeve in a central position. It has three and sometimes four set screws through its sides. These are for the purpose of locking the sleeve at its proper stop-off distance. After the roll is cast and fed, these screws are loosened to allow the sleeve to go down into the chill with the contraction of the roll in cooling, thus preventing upper neck cracking.

## Pouring a Large Casting Without a Crane.

BY A. LOUDON.

A short time ago I was called upon to make a bed plate weighing 7,500 pounds, and as the foundry in which I am employed does not possessany of the appliances almost invariably found in a foundry attempting to do work of that description, I was compelled to devise methods that would seem very primitive perhaps to the molder who is surrounded by all modern conveniences.

As the largest ladle only held two tons, I made a reservoir of dry sand cores, 14x20 and 2 inches thick, as that was the largest I could dry in our diminutive core oven. Fig. 1 shows a plan of the reservoir, the bottom resting on a smooth and firmly rammed green sand bed. After laying the cores B on the bottom, they were built up around the edges with a skeleton frame in the center, and with this to brace the cores, sheathing was built up around the outside, leaving about a foot of space in which to ram green sand, which was itself strengthened by having bars of pig iron laid in, as shown at Fig. 2. The iron was conveyed to the reservoir from the cupola, as shown in Fig. 1, and from

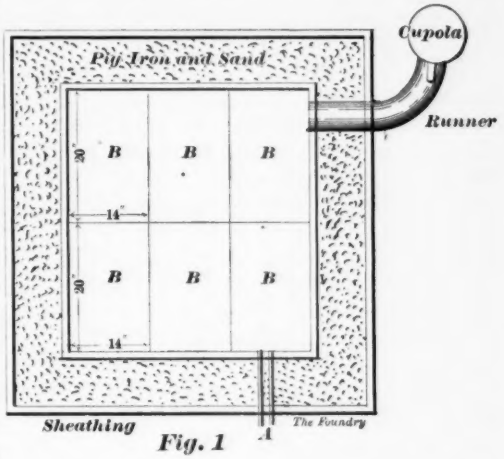



*Fig. 1*

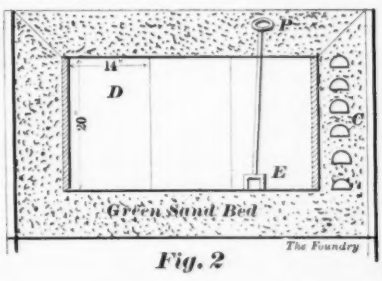



*Fig. 2*

reservoir to mold through sluice-gate, as shown at A, Fig. 1, and E, Fig. 2. When reservoir was filled to point D, I opened gate by means of plug P and allowed iron to run through runner built to pouring gate of mold.

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A large crane is being built in the foundry plant of J. W. Strattard, of Marlboro, Mass.

The Columbia Foundry Co., of Philadelphia, Pa., was recently granted a charter. The capital stock is placed at $25,000.

The foundry and machine shops of E. C. Wehrifritz, at Little Rock, Ark., were entirely destroyed by fire recently. The loss will amount to about $40,000.

## The Stove Foundry.

W. J. KEEP.

AT the present time there is no literature regarding the stove foundry. The business has peculiarities which make it stand by itself. The first principle with the average stove manufacturer seems to be, to see what goods a competitor is making which are a success, and then to imitate them. This divides the manufacturers into two classes, originators and copyists.

There have been few successful originators, and the first cost of the patterns for original stoves is very great. Firms that lead the market often expend $50,000 for new patterns in a single year.

To be a successful originator requires a peculiar kind of inventive genius, unlike that required in any other line of manufacture. He must be directly connected with a stove foundry, so as to be in close contact with the trade. A remark by some salesman or customer may suggest an idea. He must not be radical, for it is as disastrous to be a year ahead, as a year behind the trade. He must understand every branch of the business, to know what can be accomplished in each department.

The selling part is as important as the manufacturing department. Very curious methods are in vogue in this branch of manufacture, which make it very difficult to manage the financial end. Stock must be made during nine months to supply the trade during the three shipping months, and often more capital is required than the volume of business done. The company must also have immense storage facilities. The trade is so capricious that it is a mere guess as to what kinds and sizes of stoves will be called for when the fall comes.

Stove making is peculiar in other respects. The mechanics work by the piece, and if the parts of a stove will not fit each other without extra work being put on them, the stove will cost more than the market will pay for it, for the competition of those who imitate has brought prices down to a point little in excess of the cost of the goods.

If the parts are difficult to mold, the cost will prevent the sale of the stove, and the average molder cannot make it. The problem is to produce the best castings with the least expense. To do this the best of materials are required. Poor facing will wash or burn, and make inferior castings.

The way to make money in stove work, is to run full each working day of the year.

The works should be arranged so that nothing shall go backward. From the point where iron and coke enter the foundry yard, everything should go forward with the least possible expense. Up to this time, machinery has not been employed to transport any part of the product, and this is a very difficult subject to handle. The gangways of a foundry should be perfectly clear by 7 o'clock in the morning, but in large establishments this is not done before 9 or 10 o'clock. The scratch shop, for removing sand from castings, should be reached as directly as possible from all parts of the foundry. Plate that will stand it, is cleaned in tumbling barrels, and the rest is cleaned by hand with brushes. From this point the castings are piled on shelves, all castings being placed in racks, one for each piece, and of a size that will hold the number of pieces made in four days. The location of polishing and nickel plating departments should be such, that when the castings leave the scratch shop, they should go ahead in one direction, until the finished nickel meets the finished stove at the crating floor.

After thorough inspection, packing and crating, the stoves are piled in the lofts ready for shipment in the fall. The details of the departments are so specifically related to this special business that a description of them would not interest those engaged in any other branch of foundry work, and a peculiarity of stove manufacturers is, that each one thinks that the others are not managing the business as well as he is. Therefore, any detailed description would not interest even the stove manufacturers.

The management of cupolas, and the mixing of iron, and methods of keeping castings uniform in quality, are of the same interest to all, and we have, there-

fore written on these subjects at various times.

The process of molding is not of general interest, as it is not generally applicable to other lines of foundry work. Every effort is made to enable the piece molder to make the most money in the shortest time and with the least labor.

Stove castings are made in two-part flasks, consisting of cope and nowel, hinged at the rear. The pattern is so made that the cope can be rolled off, without loosening with wedges if possible, and give a clean lift (no rats), and bars with nails driven in them are so located as to anchor every hanging core. No separate cores, green or dry, are used in stove work, and the size of the flask leaves only one inch of sand outside the edge of the pattern. Stove patterns are of iron filed as smooth as possible, and waxed to prevent rusting. They are boarded face up, that is, fitted to a wooden follow board to give the under side a bearing to prevent breakage, or springing by ramming.

The follow board has wooden cleats on the back, which are bedded in sand on the molding floor, that it may lie perfectly solid. All dust and moisture is brushed from the pattern, as the slightest rust will make a rough surface on the casting. The nowel, which has no bars, is placed on the follow board, and sand is riddled through a No. 12 sieve, to lie one-quarter of an inch deep on the pattern. Then sand from the heap is shoveled to fill the flask. This is rammed and leveled off with a straight edge. Sand is thrown over this and a bottom board is rubbed down to give a true bearing surface. This bottom board has holes in it to allow gas to escape.

Iron clamps are placed on each side, and the box is rolled over, allowing the cleats of the bottom board to rest on a sand-leveled floor.

The follow board is then lifted off, leaving the pattern bedded in the sand. If the parting line is not firm, the molder presses sand with thumb or trowel, until the edge of the pattern makes a perfect parting with the sand. Parting sand, which is burned molding sand, is thrown over the whole surface, and what has fallen on the pattern, and any superfluous quantity is blown off with a bellows.

The parting is made by the close fitting of the follow board to the pattern, and any crooked corners are built up with pieces of old leather belting. If the casting is to be run from the edge, iron set gates are placed against the edge of the pattern on the follow board and molded in the nowel.

The parting sand having been blown off, the cope is placed on the nowel and clamped in place, and sprues are placed in position. Flat sprues are set on the pattern, bottom side up. Sand is now shoveled in, and with the hands is tucked under the bars and around the sprues, the flat ones being turned over. The cope is then filled with sand and rammed, the superfluous sand being brushed off. The cope is then rolled off, and rests on its hinges and on a box placed in the rear. The sprues are drawn out, and the inner opening is trimmed with a slick to prevent loose sand breaking off with the inflowing iron. The pattern is now withdrawn, and if there are any imperfections in the mold, they are repaired. Heavy facing is shaken over the mold, and when the cloud has settled, light facing is shaken over this, both from muslin bags. The pattern is now printed back, the set gates are withdrawn, and the pattern is removed.

The heavy facing is to prevent the iron burning the sand, and to give a smooth surface and a good color. The light facing is simply to prevent the pattern from sticking to the heavy facing. If any heavy facing should stick, it would leave a rough spot—if too much light facing is used it will wash and run before the iron, and will make a worse surface than sticking heavy facing.

The mold is now closed and clamped exactly as it was when rammed up.

We have given this outline of making a mold to give an idea of the difference between this and machinery molding, not in sufficient detail to enable a novice to tell how to make a mold, for such a description would not interest the general reader.

A stove molder moves quickly, every motion counts, and he is systematic in his work.

A molder's floor is from 7 to 9 feet wide by about 28 feet long, and will hold two or three rows of flasks. His pile of sand, which was tempered the night before, extends the length of his floor, and his flasks are piled in a row along the side of his sand heap. He has taken the patterns which he is to use during the day, from the fireproof vault, has placed the first one he is to use on the follow board, at the front of his floor with the nowel in place. The same is found on each floor, and at 7 in the morning, down each side of the gangway, stand as fine a row of men as you can find anywhere, with rammers in hand ready to strike the first blow together, at the blow of the whistle. These men work by the piece, and keep in line so that by the time the melted iron is ready, they have reached the back end of their floors.

In stove work, a number of distinct trades are brought together—designers, modelers, wood-patternmakers, plaster workers, iron-patternmakers, polishers, electroplaters, buffers, carpenters, follow-boarders, japaners, casting scratchers, floor molders, bench molders, cupola melters, grinders, stove mounters, inspectors, tinsmiths, sheet-iron workers, blacksmiths, flask makers, pipe fitters and machinists.

Each of these two dozen trades belong to the stove business. Each man understands his trade, so far as it is used in this particular work. That is, a stove carpenter could not work at house carpentering, and a house carpenter would be of no use in a stove foundry. This is the reason why there is no literature on stove making. It is a business that stands alone. It is peculiarly an American institution, and is so unlike any other foundry business that others would feel no interest in reading about it, and few men working in one department would feel any interest in the work of another. The more prudent firms have elaborate systems of determining the cost of their goods before fixing the selling price, and each department of the manufactory is managed in the most systematic manner. If the public were interested in the matter, chapters could be written on each individual department. The more systematically everything is managed, the less chance is there for misunderstandings between employers and men. The interest of one is the same as that of the other. Each man is working for himself by the piece, and is his own master, the firm providing shop room, materials, money, and a market for the goods; while the men are a community of small manufacturers, each in his own line, earning money in proportion to his skill and enterprise, and all under a general management. This is as nearly as practicable, a model manufactory.

The men form one of the best elements of a city's population, earning more than the average wages, and the majority own their own homes.

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### The Bondholders' Prayer.

AS a parody, the following from an address delivered at a recent mass meeting in Cincinnati, is rather interesting:

Our father, who art in England, Rothschild be thy name, thy financial kingdom come to America; thy will be done in the United States as it is in England. Give us this day our bonds in gold, but not in silver; give us plenty of laboring men's votes to keep monopoly in power and its friends in office. We know, our father, that we have done many things that were wrong. We have robbed the honest poor, and brought distress to many a door. We know it was wrong to refund the bonds and make them payable in coin. We know it was wrong to water all our railroad stock; but thou knowest we gained much by that. Now, our father, thou knowest we are above politics. It is the same to us whether the Democrats or Republicans rule; for thou knowest we are able to sway all political and legislative jobs in our favor. Lead us not into the ways of the People's party, and deliver us from the insane labor agitators and reformers. Then we shall have the kingdom of bonds, interest, taxing power, and all the gold till the republic shall end. Amen.

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The Cohoes (N. Y.) Iron Foundry has been started up on ten-hour time.

# THE FOUNDRY

A TECHNICAL JOURNAL DEVOTED TO FOUNDRY INTERESTS.

*Published Monthly by*

"The Foundry Publishing Co."

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THE FOUNDRY is issued promptly on the tenth of each month, and will spare no endeavor to furnish valuable news and information to those interested professionally or incidentally in molding, melting, mixing of metals, foundry management, etc. Persons connected with any of these lines of industry will confer a favor upon the Editor of this Journal by sending him news from their section of the country pertaining to the foundry interests, particularly individual theories and experiences of practical value.

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## The Compliments of the Season.

THE FOUNDRY *can consistently wish its* readers all a Merry Christmas and a *Happy New Year.*

We do not forget the fact that the stagnation in trade is going to have the effect of materially curtailing the general rejoicing at this season, but every cloud has a silver lining, and in this case the lining is beginning to be clearly apparent. Let us all do our share to restore the general confidence so necessary in times like these, and aid the development and prosperity of the glorious country. Then, and then only, can we enjoy the consciousness of having done our full duty, and 1894 will be the happier and brighter in consequence.

## Mention "The Foundry."

THE especial attention of our readers is called to the advertisements in this month's issue of THE FOUNDRY. They are with us because of the well-known reputation this paper has among foundrymen, and because of their patronage we are enabled to furnish a paper that is unexcelled on this continent, when its merit and price are considered.

When writing to these advertisers it will be doing THE FOUNDRY a personal favor if this paper is mentioned.

Index to Advertisements, page 89.

## One Dollar.

WHEN the publication of this paper was first undertaken it was not possible to foresee that it was destined in the pointed language of the day, to make a "hit" to the extent to which that expression is applicable to our own case. At first the subscription price was fixed at $1 per annum. Afterwards when the paper was enlarged it was thought that $1.50 a year would not be too large a sum, and in comparison with other trade journals it would still be most excellent value, at the same time permitting us to pay a small commission to agents for securing subscriptions. The continuous increase in our subscription list and the corresponding prestige it has given this paper among advertisers who have not been slow in availing themselves of the opportunity to reach the foundry trade, enables us to make the announcement that, commencing with this issue, the subscription price of THE FOUNDRY will be $1 per annum, single copies 10 cents, "for sale by all news dealers," etc. This is only in line with our original policy, and not in any

way a deviation or change in the plan upon which this paper has been thus far conducted, as it has been and will be our aim to furnish our readers with the best service and at the lowest possible price. It is anticipated that this reduction in price, added to its already established reputation, will insure for it one of the very largest circulations of any trade paper in the country.

## A Serial Story.

ON another page ourreaders will notice the opening chapter of a new serial story, entitled "James Chalmers," which will run through several numbers. It has been written expressly for THE FOUNDRY by a machinery molder, who is well known in a good many American cities where he has worked at his trade. Molders are not usually credited with possessing literary ability to any phenomenal extent, but, as will be seen, the author of this story is a remarkable exception to the rule and his easy, flowing, graceful style, coupled with his knowledge of the business and the habits of those engaged at it, render him exceptionally well qualified to handle this subject as it has never been done before. We feel sure the contribution to our reading columns will be read with great interest by our thousands of readers who will remember that its author is a molder whose education has been acquired in the face of the most adverse circumstances.

## Edward Delavan Ransom.

E. D. RANSOM is dead and buried. To scores, yes, hundreds of THE FOUNDRY readers this news will come in the nature of a shock that will be felt for a long time to come. The sad event occurred at his home in Albany, N. Y., Sunday morning, November 12, under such peculiarly sad circumstances as to inspire in the minds of everyone who knew him, the greatest possible measure of sympathy for his family and friends.

Saturday evening, November 11, he retired at his usual time, and to all appearances in his usual health and spirits. At 11 o'clock he was taken sick with an attack of hemorrhage of the brain and at 4 a. m. death claimed for its own one of the best known and most popular gentlemen in the American foundry world.

He was born in 1851, and was for a number of years interested in the Ransom Iron Works, and for the past ten years has been at the head of the well-known supply house of E. D. Ransom & Co.

Among his business acquaintances he was favorably known for his geniality and good nature coupled with a more than ordinary measure of integrity, which asserted itself always in the most minute business transaction. He was of an unusually kind and charitable disposition which never showed itself more conspicuously than when speaking of his business competitors, to whom he always referred most kindly. The very word "Albany" was associated in our minds with the cordial grasp of the hand and warm welcome that invariably awaited us in that city from he whom we will now meet no more.

He had the precious faculty of making friends, forming attachments that money can not buy, influence or command, but which finds its origin in a warm-hearted disposition, so few business men in this purely materialistic world possess. We feel his loss as a personal one, and THE FOUNDRY extends to his widow, 6-year-old son and business associates, on behalf of American foundrymen generally and ourselves, our most sincere and heartfelt sympathy.

## The Foundry Trade in Chicago.

OUR Chicago correspondent, whose interesting letter appears in another column, evidently takes a very pessimistic view of the trade outlook in that city. He forgets that for the past three years the Chicago foundries have been rushed as they have not been since the fire. The extraordinary impetus given to building and local enterprises of every sort by the World's Fair, gave the Chicago foundries an unusually large amount of work, and it is to be expected that a general slacking up was to be looked for in that line there which the hard times have only intensified and consequently Chicago can hardly be looked upon to reflect conditions elsewhere.

The point he makes concerning the lowering of the tariff on agricultural implements is also, we think, hardly borne out by the circumstances, as American manufacturers are heavy shippers to foreign countries, and have no reason to fear foreign competition. This is true to such an extent that in spite of the almost prohibitory tariff in force in Canada, American manufacturers have frequently sold their machines there in competition with those of Cana-

dian make, and met Canadian prices after paying the duty.

THE FOUNDRY believes, however, that when trade begins to improve that the City by the Lake, whose fame for its get-there-ativeness is world-wide, will be in the front row.

## $76,000,000

A FEW months ago this country, or rather enough of its citizens to control for the time being its affairs, got frightened. They saw, or what amounted to the same thing, thought they saw a ghost, and as a result, they suddenly decided that banks and other financial institutions were not to be trusted.

People of all classes, from men of wealth and influence to the humblest toiler, made a rush for their cash deposited in the banks of the country—then we had a panic.

The result is well known—people gradually found that they were making a mistake, and money found its way back to its usual channels. This was all deplorable enough and people looked for a return of prosperity upon the return of the money, but we have now confronting us a situation that possesses peculiar dangers of its own, while being directly opposite to the first one. The banks are overloaded with money, and in New York, the country's financial metropolis, the banks have accumulated a fund of $76,000,000 over and above the required legal reserve.

Some may regard this as being an element of strength, but it is the reverse, as showing that in that one center alone there is that amount of money lying idle that should be in active circulation, and the larger that sum gets, the more severe the depression is likely to be. With the first of the year, though, it is certain to find its way back again into the channels of trade, and business men will watch for the future reports from that direction with no little interest.

## The Trade Outlook.

WHILE the foundry business is suffering from the universal depression as much, we believe, as any other industry, and more than some, yet we think that the worst of the business stagnation is past and that confidence is being gradually restored, especially in the northern and central states.

More pig iron has been purchased or contracted for during the past thirty days than during the previous three months, and people nowadays do not buy that article for fun or for their health, although the price is not perhaps as high as it was a few years ago. The stove foundries have perhaps been as a rule for the past two months the busiest branch of the foundry business, but a general stacking up can now be looked for all along the line, and the usual month's shut-down that sets in at the holidays may be precipitated somewhat earlier and last longer in some cases.

The agricultural shops are starting up slowly and with a limited number of employees. It is said that quite a stock has been carried over by some of the large reaper and mower concerns, and this means a greatly reduced production, though just how much cannot be known. Malleable iron foundries have not suffered as much from the depression, as far as we can learn, as other branches, and many shops are running more or less full-handed though with no great superfluity of orders.

It is in the machinery business, however, that the business depression is most marked, and in all of our cities and manufacturing towns the machinery molders are walking the streets to an extent that has not been known for years. Some places have managed to keep running on contract work up to recently, but little new work is being ordered in the way of engines or machinery and a very marked improvement need not be looked for till after New Years. An encouraging feature is the general hopefulness and the fact that notwithstanding the approach of the dull season, business is getting in better shape and we are certain that our January report will show up brighter than for some months past.

## The Scrap Heap.

This is not a political paper.

* * *

We just make this announcement as a sort of preliminary, and because a large section of the daily press and almost every trade journal, especially those interested in the iron, or metal, trade, are just now devoting a good deal of their space to partisan political criticisms in an effort to fasten all of the evils of hard times, etc., on the shoulders of a certain political party.

* * *

This party, its platform, or the fear of either or both may be to blame for some or all of the evils these politicians are just now trying to

fasten on them, but the very fact that a strongly biased partisan feeling actuates men in discussing politics who are otherwise unprejudiced and just, does not make their case any stronger or the defense of the aforementioned political party any weaker.

* * *

Let us inquire as to the duty of the ideal American citizen at such times.

* * *

We noticed a short time ago a report of an interview with one of our United States senators that was published in one of our daily papers, in which this gentleman consigned the whole country, its industries and all it contained to the demnition-bow-wows until such time as another general election took place that would reverse the present position of the two great political parties.

* * *

This gentleman was a large capitalist—a millionaire, we believe (the chances are that had he not been, he would not have been a United States senator from his particular state), interested in several financial enterprises with a large circle of acquaintances and much influence among people to whom his word is law and all his utterances inspired.

* * *

Now, THE FOUNDRY thinks that for a United States senator, who is one of two men representing one of the largest states in the Union in the upper branch of the nation's legislature, to resort to the methods of the partisan politician in times like these is a most questionable proceeding when public policy and even good sense would dictate that as cheerful, pleasant and hopeful a view as possible should be shed on the situation, when all know and have seen during the past summer that the country was suffering a thousand times more from a lack of confidence between men themselves (in which national politics had *directly* nothing to do) than anything else.

* * *

It would have been deemed a criminal offense in the eyes of many good business men, had any one circulated stories reflecting on the credit or policy of any of our banks, financial industries or enterprises that were conducive to the general prosperity, or had such statements been made about the policy of those to whose keeping vast interests were intrusted, with the express purpose of bringing such persons or their admiuistration into disrepute.

* * *

Why? Because were the policy of the directors of a prominent bank assailed day after day bitterly through the public press and elsewhere, it would have seriously injured the most solid enterprise in America, when public confidence was necessary to its success.

* * *

It may be answered that if criticism is deserved it should be administered, but that is not always true, as there are times when it is the better policy to conduct affairs without proclaiming our personal animosities or ideas when the public prosperity is at stake, and then again in the case referred to it must be remembered, though often forgotten, that our legislators do not represent only those of their own particular political faith, but the whole people, some of whom may have the courage to sometimes differ.

* * *

THE FOUNDRY is impressed with the idea that a United States senator occupying such a position and using it to destroy public confidence in the business world and thus injuring to the limit of his ability our national prosperity in order that the fortunes of his political friends may be advanced at the cost, temporarily at least of the country's best interests, is making a grave mistake. It may be good politics, but it is certainly poor statesmanship, and with such examples before us, it is no wonder capital insists upon sitting still instead of actively engaging in legitimate enterprises.

* * *

Let us be Americans first and politicians afterward. There are too many industries and energetic people here; there is too much wealth and capital and too many thousands of bright business minds who hold no office and believe in the country first and political parties ofterward to allow a few individuals to control this country's present or future prosperity, especially when there is a suspicion that self-interest and not an unselfish devotion to the public good is the main spring of their actions.

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Warder, Bushnell & Glessner Co., of Springfield, O., have selected a Connersville blower to do the work in their new foundries, Mr. Chas. A. Bauer, the general manager having selected that one in preference to all others presented to him.

## Verbosity.

MR. EDITOR: To be tedious by using a multiplicity of words is, in the parlance of the street, to "talk an arm off," or "to talk one to death." It may not be just or proper to accuse some of the would-be instructors in foundry practice of sinister designs when writing an article for a trade publication, or to suggest that they contemplated the surgical operation above referred to, and yet their too liberal use of words not only obscures their meaning, but has a tendency to make the reader weary. The adage, "Brevity is the soul of wit," might be applied to the entire catagory of expression. One other quality—that of simplicity—is perhaps as important in a paper whose object is to instruct. The combination of the two qualities referred to, however, is certainly what is needed, and needed badly. We have a surfeit at the present time from men whose knowledge of foundry methods is doubtless all right, but when put into print is so clumsily expressed in big words and stilted phrases that it is time for protest. There have been articles written covering pages, and there are bound volumes also, which do not contain as much boiled down information as may be had from Mr. Keep's article, "Chemistry in the Foundry," in your November number which fills just three columns.

Here is practical information, devoid of theory, and of value to every man who owns, or hopes to own a foundry. It can be understood by any man who can read English, and is so brief, simple, clear and concise that "he who runs may read." F. B. S.

**A FEW YEARS AGO**

**There was little or nothing published of interest to the foundry business. Now foundrymen have the best and cheapest paper of its kind in the world. Subscribe.**

Robert Mackellar's Sons, facing manufacturers of Peekskill, N. Y., celebrated their bi-centennial year by a full-page ad. in THE FOUNDRY this issue. The reputation of the Peekskill facings has always been very good, and the proprietors may justly feel proud of their past record.

This concern was evidently in the foundry facing business in the very beginning almost, of the foundry business in the country, and is the oldest by far, now in existence. This can hardly be construed otherwise than as a tribute to their goods, showing that they are appreciated, and THE FOUNDRY sincerely hopes that their boast, that "Facing mills come and facing mills go, but we go on forever," may be fulfilled.

## James Chalmers.

### The Unvarnished History of a Common Man.

BY W. EDWARD.

### CHAPTER I.

"SAY partner, what's the show for a job here?" I raised my head from the flask over which I was bending and took a careful scrutiny of the man who had spoken to me, before I replied: "Well, I don't know, better see the boss, because I think he needs a man." But say, partner," as he turned away in search of the foreman, "have you got your card with you?" A smile passed over his face as he drew from his pocket a dingy piece of pasteboard, so crumpled and dirty that I could scarcely decipher it, and said as he extended it to me, "Oh, yes, I never travel without my ticket." I had seen plenty of his species, many of them to my sorrow, but there was something about this one which impressed me favorably, and I caught myself wondering, as I went on with my work, what there was about this particular "hobo" to attract me. He was a little above the medium height, of a fair complexion, roughened by exposure and hard work; with broad shoulders and a short neck, indicative of strength. He was apparently about 30 years of age, and with a good suit of clothes might have been presentable in society, but his dress showed too close an intimacy with the sand heap, and a whisp of hay, which clung affectionately to his coat collar, suggested that he might have lodged over night in a friendly stable or under a hay mow. Yet with all of the ear-marks of the "professional" about him, I felt that he was a little above the ordinary and hoped that he would succeed in getting a job.

In a few moments he sauntered back to my floor and I greeted him with, "Well, partner, what luck?" "Oh," said he, "the boss says he has plenty of work, but he has no room for me." It was a Saturday afternoon, early in March, the weather was cold and raw, and I

debated the question in my mind for some time before I spoke, whether to invite this man to share the hospitalities of my home over Sunday, give him a few square meals, of which I saw he stood badly in need, and a comfortable bed. At last I said, "Well, partner, I hate to see a man run away from a job such weather as this and if you want to lay over here for a few days you're welcome to stay with me." The look of relief and thankfulness which spread over his face repaid me for my contemplated charity and I felt, as he thanked me, that my confidence was not misplaced. I had "held up" tramps time and again to find my hospitality violated by some petty act or bold robbery. On one occasion I had taken a man in and cared for him for three days, in the dead of winter, even giving him money to buy tobacco. Afterward he had confided to a shopmate, "If he had known the kind of a 'chew-shop' I put up at, he wouldn't have gone with me." Another whom I had kept for a few days and helped to get a job, had "jumped out" with two weeks' pay in his pocket, taking nearly my full kit of tools with him and leaving a three-weeks' board bill which I was compelled to pay, having gone security for him. After these experiences it was only natural that I should be careful whom I helped, or placed in a position where they could take advantage of me, and I had studied this stranger very closely before making him the offer of my hospitality.

It lacked but a few minutes of blast time, and having clamped up my work, I sat down on the corner of a flask to have a chat with my "hobo." I found that he was a fairly intelligent man, and the quiet force of his remarks as we discussed shop topics impressed me that he was a good mechanic as well.

I was working in St. Louis at the time. The shop was one of the ordinary type of jobbing shops, where a vast amount of work is expected for a very small amount of money. The foreman was a most peculiar man. Raised in a neighboring town he had come to St. Louis a young man, and had never since worked anywhere outside of the city. Polite and courteous to a stranger, he was a veritable tyrant to "home" men. In fact, one of his greatest peculiarities was his unaccountable antipathy to St. Louis men, and one of the invariable questions which he put to an applicant for a job was, "Have you ever worked in the city?" A negative answer to this question always brought a more favorable consideration for the applicant. I have seen him tear his hair, throw his hat in the air and jump upon it when it fell upon the floor, as if he had some imaginary enemy under his feet and was grinding the life out of him, when some of his most trusted men happened to lose a piece of work, and a moment after he would turn to a stranger who had been equally unfortunate, with a smile of encouragement on his face, point out to him where his work was defective and how to remedy it. I had given up trying to fathom the mysteries of this man's character, but knowing his peculiarities I felt hopeful that my "hobo" —I already felt a sort of proprietorship in him —would be successful in getting a job in a few days.

After shaking out my work with "Jim's" assistance—he had told me his name was "Jim" Chalmers—we repaired to the hotel which I called my home. It was not a very pretentious affair, it is true, but a man can't be expected to support much style on $15 a week. It was quiet and comfortable and there was always an abundance of wholesome food on the table which, if it did not tickle the palate, satisfied the inner man. The one point of disagreement between the landlady and myself was my predilection for tramps, whom I was continually sending to her to feed, but as I always paid my bill without any complaint I could generally get the best of the argument when she attacked me on this weakness. Still, it was not without a feeling of trepidation that I introduced my "hobo" into her august presence, and that only after he had washed and brushed and donned a coat which I had given him from my own scant wardrobe. It being pay-night, my landlady was all smiles and effusiveness and I escaped, for the time being at least, the lecture which I had almost expected.

A hearty supper, a bath and the removal of a week's growth of hair from his face worked such a change in "Jim" that I hardly knew him when he stepped out of the barber's chair, and I began to think that really he was a rather handsome man. After strolling around the streets for a short time we returned to the hotel and settled ourselves before a blazing fire for a chat and a comfortable smoke. A few books on a hanging shelf drew "Jim's" attention and he began to question me on my favorite authors. I had always been a voracious reader, but had read everything and anything which came within my reach, without any method or discrimination of subjects. I was equally content with the poet, the philosopher or the sentimental novelist, but in this man I

soon discovered a well-balanced and trained mind. He had evidently read much and had thoroughly digested what he had read. Finding an interested and appreciative auditor he regaled me with quotations from Burns, who was naturally his favorite—he being a Scotchman—Shelley, Byron, Browning, Scott, and many other authors of more or less merit interspersed with commentaries on the beauties of the style of each, which showed him thoroughly conversant with the productions of most of the poets.

The conversation becoming more general, I was surprised and delighted with his knowledge of history, philosophics and economics, and I began to wonder how a man who had bound himself down to the trade of iron molding could gain so much knowledge on so many widely differing subjects, and not only that, but I was anxious to learn why a man of his evident abilities could tolerate the life of a tramp, with all of its miseries and degrading influences. I was always of a rather romantic nature, fond of stories of adventure, and I thought if I could persuade this man to tell me the history of his life it would be highly interesting, perhaps full of adventure, at any rate I was satisfied in my own mind that he had fallen from a higher sphere than that which he occupied at present, from love of drink, or some other misfortune. The opportunity presenting itself, I said to him, "'Jim,' do you feel satisfied with the life of a tramp, or don't you think a man of your capabilities could do better?" A quizzical expression came over his face as he replied, "Well, 'Bill' "—we had become quite intimate by this time—"I am not satisfied with the life, but what can a poor devil of a molder do with neither money or friends but to look for a job at his trade? And that's all I tramp for, it isn't because I like it." "But," I persisted, "you have worked at something else outside of the sand heap, haven't you?" "Oh, yes," he replied, I "have been out of the sand heap more than once, but I always managed to drift back into it again, perhaps because I am not fit for anything else." I felt inclined to dispute him on this point, but I was anxious to find out how he came to be in the position in which I had found him, so I asked him, "How did you come to be a tramp?" "Well," said he "that is a short story. I was working in a shop up in a little town in New York State until the 1st of January, when I was laid off. Since then I have been in a dozen states looking for work, and you know it does not take a man very long to run down when he is forced to go on the road." But this isn't your first experience on the road, is it?" "No," said he, "I have been pretty much of a 'hobo' for the last ten years, but I am getting mighty tired of shifting from pillar to post, and I would like to settle down. I am pretty well tired out tonight, but if you have nothing else to do tomorrow I will tell you some of my experiences on the road." This was what I had wanted, and excusing myself for keeping him out of bed so long, I showed him to his room and bade him good-night.

(TO BE CONTINUED.)

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**A BACK NUMBER**
**Is a term sometimes applied to a man who is not posted. You will be a back number if "The Foundry" does not reach you regularly.**

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## Notice.

IN printing the article on page 61 entitled "Pouring a Heavy Casting without a Crane," a slight mistake was made in the heading of the first few printed. We ask our charitably disposed critics not to be too severe on the compositor and proofreader.

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## Our Chicago Letter.

(*Special to* THE FOUNDRY.)

THERE is no noticeable improvement with the foundries over last month. To all appearances trade remains the same, very dull. Contrary to all expectations the passage of the Repeal bill has brought no relief to the manufacturing interests. Congress alone holds the key to the situation in the question of the tariff, but not in the form of the Wilson bill, the passage of which can only result in disaster. The placing of agricultural implements on the free list will in no way improve the situation in this city. The large concerns located here, engaged in the manufacture of agricultural implements and who employ thousands of hands will have to either make a reduction of wages or close down their works. As there are now two men for every vacant position, what will be the condition of things if this bill becomes a law? Should it fail to pass in its present form and is amended, or a substitute is passed beneficial to the manufacturing interests, there

will be an early resumption of business. On the other hand, should the administration insist on its passage in the present form there will be no improvement until there is a change in the government. The trade papers and commercial reports say times are getting better, but such is not the case. It is only an attempt on their part to bolster up trade by talk. It is an old saying and a true one that, "talk is cheap, but it takes money to buy whisky." If a man has no work in his shop you can't make him think he is busy by simply telling him so. Whatever trade may be elsewhere in the foundry business it is dull in Chicago, and a visit to the various foundries in the city will confirm the statement. With trade in its present dilapidated condition, and a tariff reform measure floating from the flagstaff of the present administration, threatening the manufacturing interests of the country, will lend to the foundrymen's vision of better times anything but brightness.

Dawson Bros. report business slow.

Fitzpatrick Foundry's business is dull.

The F. E. Roberts Foundry is advertised for rent.

Preble Machine Co., South Chicago, is not doing much of anything.

Webster Manufacturing Co. say business is slow.

Home Foundry is running three heats a week.

W. A. Jones' business is fair, running a heat every day.

Turner & Dickinson will soon move into their new foundry at Hansen Park.

John Featherstone's Sons have contracted to build six ice machines.

Kurtz & Buhrer say business is slow, running three and four heats a week.

Chicago Architectural Iron Works are not doing very much, running one and two heats a week.

A. Bolter & Son have the contract for the iron work of the Standard Varnish Co.'s warehouse to be erected at South Chicago.

Mr. King, purchasing agent for the Griffin Wheel and Foundry Co., has severed his connection with that firm.

Winslow Bros. say trade is fair. They have the contract for the ornamental work of the new Stock Exchange building at the corner of La Salle and Washington streets.

Brown Bros. report business slow.

A. Plamondon reports business slow.

Central Foundry reports business fair.

Railway Supply Foundry Co. have closed down until spring.

James Frake reports business flat, working one molder.

Mason & Davis, at Grand Crossing, report business slow.

Union Foundry, at Grand Crossing, report trade poor.

Chicago Skein and Axle Co., at Grand Crossing, are running three and four days a week.

W. D. Kent, successor to the M. Benner Co., is running very slow.

Dan Monroe reports business fair, but nothing to boast of.

Lake Shore Foundry report business some better than last month.

Plano Manufacturing Co. are just completing their large plant at West Pullman, which will be ready to open by the 15th of December.

McGreevy & Haggerty, who run two foundries, had the one at 66 Michigan street destroyed by fire at 2 o'clock on the morning of November 8.

The Grant Locomitive Works, at the corner of Twelfth street and Robinson avenue, which went into the hands of assignees June 7, 1893, is now offered for sale. Sealed proposals will be received at the office of the assignees, room 509, No. 100 Washington street. Wm. K. Ackerman and James H. Wilson are the assignees. The property is offered subject to a first mortgage of $200,000, dated December 1, 1892, and payable on the first day of December, 1902. Secured by a trust mortgage from the Grant Locomotive Works to the Chicago Title & Trust Co. Proposals will be received until January 15, 1894. H. S. V.

## Pittsburg and Vicinity.

(*Special to* THE FOUNDRY.)

THE iron business in this locality has not shown the improvement that was expected a few weeks ago. The amount of business being done is about the same, but the approach to anything like a change is toward lower prices.

In the Mahoning and Shenango valleys, mills are constantly resuming, but it is hard work to keep them in steady operation.

No. 1 foundry iron is now selling at $11.75 @

$12 cash, and No. 2 at $10.75 and $11.75 cash. Neither mill owners or foundrymen are anxious to take advantage of these quotations. Inquiries are numerous, and a turn in the market for the better within a few weeks is confidently expected.

The Kinzer & Jones Manufacturing Co., of this city, has its foundry plant running about five days a week with one-half its force.

Sterritt & Thomas, iron founders in this city, are only operating their plant on about half time.

The Springfield Foundry Co. is running its plant on part time with a greatly reduced force.

The Enterprise Foundry at Danville, Pa., has closed down indefinitely, owing to a lack of orders.

Baldwin & Graham, stove founders of New Castle, Pa., are at present running every department full, employing about 170 men.

The A. Garrison Foundry Co. is gradually increasing its working force. At present it is running about two-thirds full.

The foundry plant of the Westinghouse Machine Co., which has been running about three days a week, has been put on five days.

The Marshall Foundry and Construction Co. is making preparations for an early resumption.

The Fischer Foundry and Machine Co., of the South-side, has plenty of work on hand, the plant being kept in full operation.

L. M. Morris, an extensive iron founder, is at present keeping his plant running in a fairly active condition, having several orders on hand. Only about one-fourth of the regular force is employed.

The Leechburg Foundry and Machine Co., of this city, has nearly completed its new rolling turning shop, which will be equipped with machinery of the most modern design. This company recently closed a contract to supply all the chill rolls needed for one of the largest sheet mills in the world.

The Westinghouse Electric and Manufacturing Co., will soon begin the erection of one of the largest plants in the country. It has purchased 23 acres of land at Brinton station, on the Pennsylvania line, seven of which will be occupied by a machine shop. The foundry plant will also be of good proportions, 150 feet wide and 700 feet long. The engineer's estimate on its cost is considerably in excess of half a million dollars. The bids for the construction must all be in by December 16, the plant to be completed in six months after the contract is let.

The foundry plant of the Pennsylvania Steel Co., at Steelton, is kept in active operation.

The Lloyd-Booth Co., of Youngstown, O., states that of late there has been a decided improvement in business. It has enough contracts on hand to keep its foundry plant in full operation.

The Scott Foundry, of Reading, has secured an order from Wm. Cramp & Sons, of Philadelphia, for eight massive plates, weighing 35,000 pounds each, for the compound triple expansion marine engines to be used on the two new ocean liners now being built for the American Steamship Co.

## Among the Foundries.

Bridgeford & Co., of Louisville, Ky., expect to rebuild their burned stove foundry very soon.

The new foundry of the General Electric Co., of West Lynn, Mass., is nearing completion.

The Turner & Seymour Co., of Torrington, Conn., has awarded the contract to the Berlin Iron Bridge Co., of East Berlin, Conn., for the erection of a foundry plant, which will be of brick and iron.

Wilcox, Crittenden & Co., of Waterbury, Conn., are putting a new roof on their foundry. They have purchased the foundry plant of the Stiles & Parker Press Co., and are adding to their own plant.

The new car barn for the Easton Traction Co., of Easton, Pa., will be built by the Berlin Iron Bridge Co., of East Berlin, Conn. It will be entirely of iron, 64 feet in width and 200 feet in length.

The Phoenix Iron Foundry, at Syracuse, N. Y., has shut down on account of the dull time.

The Knoxville (Tenn.) Engine and Pump Works will add a large foundry to its plant in that city.

The Southern Pacific Railroad Co. will build a new cotton shed at New Orleans, 120 feet wide and 350 feet long. They have placed the contract with the Berlin Iron Bridge Co., of East Berlin, Conn. The building will be entirely of iron, the sides being made with the Wilson Patent rolling shutters.

The foundry of the Laconia (N. H.) Car Co. has again been started to fill an order for 700 car wheels for a railroad in that vicinity.

The Canadian foundry at Three Rivers, Que., which was destroyed by fire recently, is being rebuilt.

Blood's lower foundry, at Manchester, N. H., is again in active operation with the men on full time.

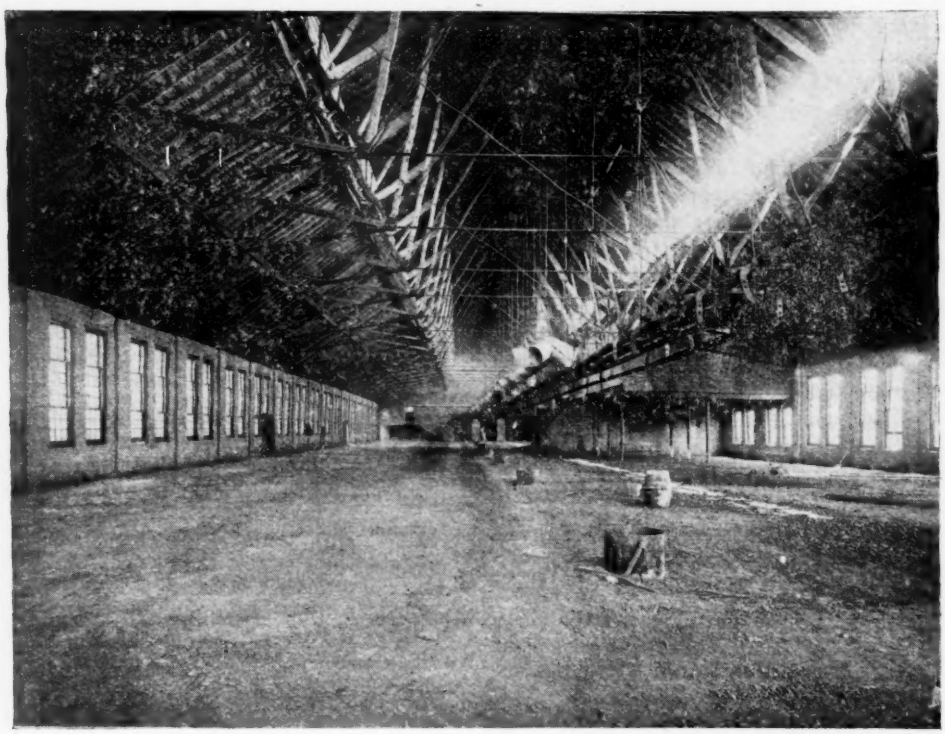
The North Reading Foundry Co., of Reading, Pa., has made a 10 per cent reduction in wages which affects about 160 men.

Co. have decided to ask for the appointment of a receiver to wind up the affairs of the company.

One of the big pipe foundries of the Mellert Foundry Co., of Reading, Pa., has shut down indefinitely, throwing about 150 men out of employment.

The Valley Foundry and Machine Works will establish works at Johnson City, Tenn.

The Automatic Wind Motor Co., of Buffalo, N. Y., is building a foundry 48x112 feet.



A new foundry, together with a machine shop, will be erected at Visialia, Cal., to replace the one recently destroyed by fire.

The cast iron pipe foundries of R. D. Wood & Co., of Philadelphia, have beeu running steadily throughout the past six months.

The Birmingham (Conn.) Iron Foundry recently cast a 12-foot, 52-inch face pulley for the New Haven Rolling mill.

The Missouri Car and Foundry Co., of St. Louis, Mo., has received a contract to build 100 refrigerator cars for the firm of Armour & Co., Kansas City.

The creditors of the Carthage (Mo.) Foundry

## The New Buckeye Foundry With Hayes' Iron Carrier, at Akron, O.

IN THE FOUNDRY of April 10, last, brief reference was made to the large, new, and in some respects remarkable foundry at Akron, O., which constitutes part of the Buckeye Harvester plant. Herewith we are enabled to present an interior view of this foundry room. It will be seen that the photograph was taken before the work was entirely completed. It will be of assistance to the reader if some facts concerning dimensions and conveniences are first presented.

The dimensions of the foundry on the ground

are 400x100 feet. The rooms not shown in our illustration are of the following sizes:

| | |
|---|---|
| Molding-sand room, | 78x32 feet. |
| Core-sand room, | 23x25 " |
| Core room, | 64x44 " |
| Tumbler room, | 64x24 " |
| Cleaning room, | 36x77 " |
| Pattern room, | 100x100 " |
| Fireproof pattern vault | 64x32 " |

During day time light is admitted to the building through 290 windows, of these windows the lower tier, in the molding room, numbering 100, are 11 feet high, the upper tier being 7 feet high; the building is also lighted by electricity.

The heating is effected by means of a Sturtevant hot air fan, the working of which requires a 20-horse power engine. The hot air is conveyed to the farthest end of the foundry room through the graduated iron pipe, as shown in the cut.

Two steam boilers of 250 horse power are required; they supply steam to the fan engine, to the Sturtevant coils, and also to the Root blower, which supplies the blast through the medium of a direct coupled engine and to a 75-horse power engine for running elevators, tumblers, etc.

Mechanical stokers are used to feed boiler furnaces. The iron ladles are dried and heated by means of a fuel-oil furnace.

Railroad tracks at the side of the building, and running its entire length, facilitate the placing of the cars where wanted for loading and unloading purposes. These tracks are the property of the company and are accessible from all the railroad systems which enter Akron.

The cupola has a clear diameter of 78 inches inside the lining; it is of the Whiting design and is 80 feet high. It has an hourly capacity of 20 tons.

The unique and characterizing feature of this model foundry is the Hayes Patent Iron Carrier; there are 400 feet of double track—800 feet in all; these tracks are suspended to the roof-trusses, leaving the foundry floor entirely unobstructed. There are no track switches, no turn tables, and there is no waste, no slobbering, no danger in handling the melted iron.

The design of the trolley is such that there is nothing to wear out or get out of order; the iron is carried in very large ladles, each operated by one man, a laborer, from end to end, reaching all the floors of the foundry. The double-handled ladles are filled as they are presented; the single-handled ladles have a hook which is dropped into a hook-eye on the carrier-ladle and are thus filled with ease, and without waste in the manner shown in the cut on an advertising page in this number of THE FOUNDRY.

The advantages conferred by the Hayes carrier are three fold. First, in the saving of expense. The work done by 40 molders in the old way is done by 8 laborers. Second, these 8 men do the distributing much easier; they are spared the slavish labor of carrying the iron. Third the molders can turn out double the work on their floor-spaces because their iron is carried to them. Distance from the cupola causes them no inconvenience or loss of time.

With the daily expense of 32 molders saved, and the foundry product obtained with so much greater ease, economy and rapidity, it can readily be seen that the Hayes carrier is a device which will repay all the investment required many times over during the year. Not only the economic advantages, but the simplicity of this carrier is such that one cannot help wondering why some such plan has not long since been generally adopted.

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## GET UP A CLUB.

**Eight parties desiring "The Foundry" for one year can have it for seventy-five cents each by getting up a club and sending a check for $6.**

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## A GREAT OFFER.

**Clubs of eight or more can have "The Foundry" sent for one year for seventy-five cents each.**

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Editor of THE FOUNDRY:

Allow us to compliment you on the contemplated improvements of THE FOUNDRY. You surely deserve success. The last issue has brought us a large number of inquiries and orders. We believe the business of the country is improving and all the foundries will soon be running again.

Respectfully,
The Adjustable Snap Flask Co.
J. H. WILSON, Pres.

## A Wrought Iron Foundry Flask.

A PRACTICAL foreman has not got to be reminded of the trouble and expense of keeping a foundry supplied with flasks. It is doubtful whether one proprietor in a hundred ever gives a thought to the matter of how much his flasks cost him. He depends entirely upon his foreman to make and keep up the supply, regardless of the fact whether that individual has either the time or facilities to do so, and wooden flasks have long since become obsolete in first class foundries. Therefore, cast iron flasks have been the only resource so far, but the rough usage to which they are subjected makes them very short lived and therefore expensive. For example, take a molder using 25 flasks a day, the dimensions of which are say 20″x24″, and weighing at least 125 lbs, at 2 cents per pound, would cost $2.50, and the drilling and turning pins would make the cost nearly $3 for each flask, or $75 worth of flasks to each molder, and except they are in remarkably careful hands and not submitted to any accidents—such as upsetting the pile—and used on very light work, it is safe to say that the average flask will not last over one year. So, $1200 or $1500 a year is a low estimate for flasks in a foundry employing 25 molders. It often happens when it is required to fill an order in a great hurry, you have the time in which to do it, but no extra flasks with which to do the work. It is a well-known fact that a molder with good flasks will do one-third more work and do it better and surer than he would with poor ones.

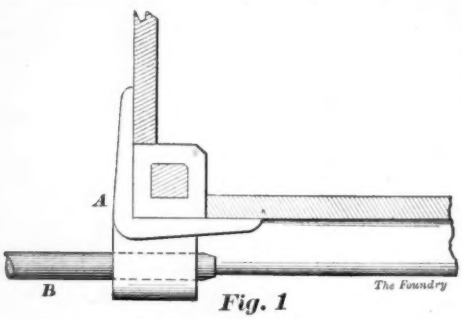


*Fig. 1*

*Section at A-B*
*Showing Corner Casting with Handle*

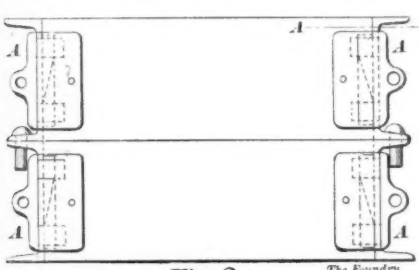


*Fig. 2*

*Ends- 5/16″ x 3″ Iron*

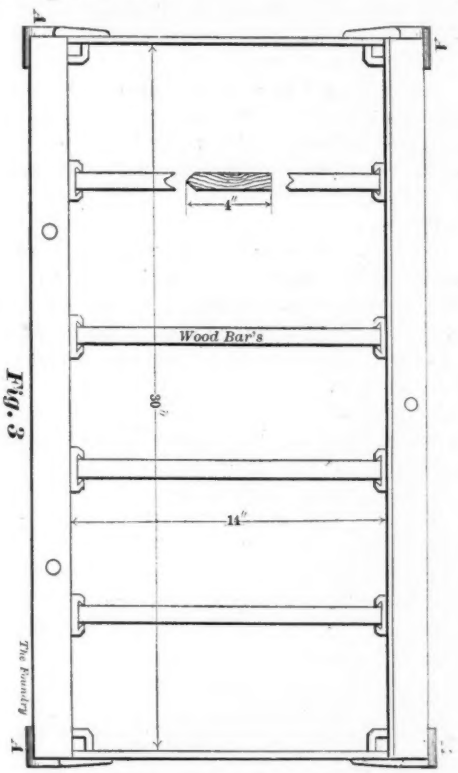


*Fig. 3*

This flask is made of wrought iron or steel, with malleable iron fittings. It overcomes all the objections of a cast iron flask and is light and strong, without any spring, and costs little, if any, more than those made of cast iron. It is practically indestructible, and can be easily changed from one side to another. It can be used with either wood or iron bars, and made in as many parts as required.

*Figure 3 shows plans of flask 30″x14″ with malleable iron corner pieces, A, A, A, A.

Figure 4 is an elevation, and figure 2 end elevation, while figure 1 is a succession of malleable iron pieces on line A B of figure 2, with movable handle set in.

These flasks are made very light, weighing much less than cast iron, and consequently the molder having a large number to handle in a day will not feel the lifting off and on so severely.

We have no doubt but that these flasks will come very largely into general use very rapidly, some large orders for them having already been received. Those interested can receive all information necessary upon application to Whitehead Bros., 517 West Fifteenth street, New York, N. Y.

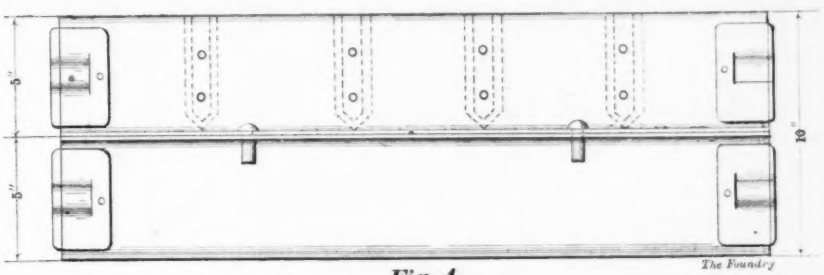


*Fig. 4*

## Interesting Forecasts.

THINKING that nothing would be more interesting just at this time than the views of the principal parties in the country engaged in supplying the needs of the iron foundries, etc., of the continent as to the trade outlook for 1894, we addressed a brief letter to each of our advertisers, asking their opinion, and from the answers received we quote the following:

RIEHLE BROS. TESTING MACHINE CO: It is very difficult for us to give an opinion about the business outlook for 1894. We might say, however, that if the Wilson Tariff Bill passes without radical modifications, the manufacturing interests of this country will be so crippled that there will be no business worth speaking of. On the other hand, it is our candid opinion that if the present tariff rates continue, the coming years will be better than the present or past.

Our business is identified inclusively with railroads, rolling mills, machine shops and colleges, and if business flourishes, all these enterprises prosper with it, and our customers are ready to buy. If business depression continues the same, customers are not ready to buy, and our business consequently suffers. The greatly improved condition of the money market does not stimulate the manufacturing of goods if there are no customers to buy them. The largest purchasers of manufactured goods are the working people who earn their days' wages. These people in turn are only occupied when the factories are in operation, and it is to be hoped that such legislation as will keep all the factories at work will be enacted now that Congress is assembled.

THE SPRINGFIELD CUPOLA CO: Under ordinary conditions this country is too rich and prosperous to remain long under a business depression like that which it is now passing through, but under the present extraordinary conditions it is impossible to predict when and how it will end, hence, in our opinion, the outlook for 1894 is far from reassuring for a general resumption of good times. We think, however, that there are some indications of a revival of business among foundrymen, having received more inquiries regarding cupolas the past six weeks than during the previous six months.

OHIO SAND AND CLAY CO: Would say that we think that the prospect seems brighter. We have had an exceedingly

gratifying business during the last month, and we are still booking good orders for molding sand. There seems to be a general feeling that things will be better early in the next year.

J. D. SMITH: What are the prospects? you ask. From this standpoint every indication is for improvement; but I must confess that the predictions I made the latter part of August got slapped in the face and I am timid about saying much about what I think of the matter. Inquiries and orders are more numerous from the South, and we are looking for a trade from that district to help us out in December. Foundrymen are only buying what they have to. The machinery and agricultural foundries are still very, very dull; but we have had a nice trade from stove foundries, which still continues and materially aids us to keep our mills running. I believe foundry business in general will be *good* by the 1st of March. I didn't say "boom" (have almost forgotten how to pronounce that word; "good" will be satisfactory enough, won't it?

CONNERSVILLE BLOWER CO: While our own trade has been excellent this fall, it is our impression, formed from the number of inquiries we are receiving, that the tide has turned in affairs generally, and a revival in business will likely occur about the first of the year, especially if the indications by that time point to no radical change in the existing tariff law.

J. W. PAXSON & CO.: It is our impression that the foundry business must improve in the near future, as everything points to that end. The past four months of depression have done much to teach economy. This great country is too large to stand still; it must progress, and the foundry business will improve. When it does come, it will come with a rush, so we will find ourselves all busy at once.

THE S. OBERMAYER CO.: We differ from the statement that the worst of the business depression is past. While it is improved to a certain extent, a great many of the factories throughout the country have not started up, as reported by the daily papers. We have our men out, and from their reports not only from the East, do they seem discouraged, but from the West and South. We have not as yet found any great improvement, but we live in hopes and think by the first of the year we will again hear the whistle of the factories calling their men to work. This increase of business will probably be brought on by a natural demand for goods of all kinds. Factories, more or less, have been closed down for such a long time that their stocks are reduced, and the demand for goods will again put all in motion.

As far as we go here, we consider business fair. We receive any number of orders, but they are smaller than the usual requirements, thus causing a falling off of sales, but we feel satisfied that we are not losing any trade, which is some consolation.

HUYETT & SMITH M'F'G CO.: From our individual standpoint, business is in excellent condition, as compared with the last six months. For some weeks we have been working every department full time and almost full force. From the nature of our business we cannot expect this to continue throughout the winter to such an extent, but from the business now on hand and in sight, we have reason to expect continuous operation and the employment of nearly our entire force throughout the winter.

We do not undertake to set ourselves up as prophets, and the above is not intended as a prediction, but we hope these impressions are correct.

MILLETT CORE OVEN CO.: In our opinion, business will be better in '94 than it has been for some time. There seems to be plenty of capital in the country, and all that would be necessary would be to invest it in core ovens, or in some other good manufacturing business.

OHIO SAND CO.: We have every reason to believe that business is slowly though surely recovering from its recent depression, and the daily increase of employment being furnished to men so long idle will place in their hands a purchasing power that will circulate money

and be felt in all lines of trade long before the close of 1894.

Orders and collections with us have improved decidedly since November 1, and strengthen our confidence in the future. McKinley's great victory in Ohio would seem to prohibit any radical change in the tariff under which we have been so prosperous.

SMITH'S PATTERN WORKS: In our opinion, we have every reason to believe that the worst of the business depression is over. We have the pleasure of doing business with 190 of the leading manufacturers in the United States. While our orders fell off 50 per cent. in August and September, 1893, orders now are coming in nicely and collections are fair.

GARDEN CITY SAND CO.: We consider the business outlook at present considerably improved over the summer and early fall months. Orders received from various parts of the country would indicate that foundrymen are preparing to start and again go to work, although we are of the opinion in a moderate way. Just what effect present tinkering with the tariff will have with affairs of our customers, remains to be seen, but we cannot see how it will be any other than disastrous. We find the bulk of our orders are received from manufacturers of specialties and agricultural implements, and but a small percentage from manufacturers of common castings and general foundrymen.

## A Coke War in Pittsburgh.

(*Special to* THE FOUNDRY.)

A COKE war is now in progress in this city, between some of the large operators, the outcome of which is being carefully watched by the consumers. The fight has been going on quietly for some time, not even the consumers being aware of it, until they received circulars announcing that on and after December 1, the price of foundry coke was reduced from $1.65 to $1.45 a ton. This fight is expected to be one of the liveliest fights that has been seen among coke operators for years, and it is thought that there may be further slashing of rates until some one is put to the wall or else gives up the fight. From the first of the present year to the end of June, the price of foundry coke was $2.30 a ton. On July 7, the price of foundry coke in the Connellsville district was reduced to $2 per ton. The demand from the beginning of July until September 1, was extremely poor, and the price was therefore reduced to $1.65. This price has been ruling until the past week, when it was again cut 20 cents, making it $1.44. A large consumer, in speaking of the cut, said that the reduction will be a temporary benefit if the fight is kept up very long, as cheap coke makes cheap iron and steel, and that does not pay. He said he did not like this rate cutting, as it does nobody good. A. M. R.

## He Knows It All.

MR. EDITOR:

ONE of the evils we see so often in the iron foundry and which is as prolific of trouble and dissatisfaction as any other one thing is the lack of practical knowledge and good sense possessed by so many men placed in positions of authority, as superintendents or master mechanics. The foreman or the molder formulates a plan to accomplish some one result, and along comes his lordship and upsets them all, thinking that just because he occupies the position, his ideas must be right, forgetting that the foundryman has given the best part of his life to the trade and ought to know its peculiarities best. He believes that anyone who can shovel sand into a flask or ram it, is smart enough for a molder, or as Mr. Thos. D. West says in his "American Foundry Practice," the foundry is the place to dump blockheads in. If foundry proprietors would occasionally give these matters more attention, I think they would find their shops run more to their advantage. A man's life is too short to learn all the different trades, but there are men in charge of some large plants in this country who confidently undertake to teach the most skilled workmen in half a dozen trades, to the disgust of those whose respect they should have. A MOLDER.

## New Foundry Enterprises.

Hayden Bros. are enlarging their foundry at Mechanics Falls.

The King Press Drill Co. is erecting a foundry in Omaha, Neb.

Sears' foundry at Ashland, Wis, has taken off its first heat.

The A. Boyce Bunker Hill Foundry and Machine Works have been incorporated at Bunker Hill, Ill.

Chas. E. Lanning is about to erect an addition to his foundry at Bridgeton, New Jersey.

The new brass foundry of Kline & Son, at Reading, Pa., is in successful operation.

The Columbia Foundry Co. has been incorporated at Philadelphia; capital, $25,000.

Arthur Fuchs and C. B. Nord have started a small foundry at Fremont, Neb., to do light work.

H. F. McCrae & Son, foundrymen of Tilsonburg, Ont., contemplate locating at Windsor.

The Iberia Foundry at New Iberia, La., which was burned a short time ago, will be rebuilt.

The Knoxville (Tenn.) Engine and Pump Works will add a large foundry to its plant.

The Valley Foundry and Machine Co. will erect a large plant at Johnson City, Tenn.

The Tyler Foundry and Machine shop has been incorporated at Tyler, Texas.

The Eureka Steel Foundry Co. are building an addition to their foundry at Chester, Pa.

The Plano Manufacturing Co. will likely have their new works at West Pullman, Ill., in full blast in the near future.

The Fulton foundry will be removed from Cleveland to Mansfield, O., a joint stock company composed largely of Mansfield citizens being at the head of the movement.

George L. French, formerly connected with the Gilbert Car Works, of Boston, Mass., has purchased the interest of J. W. Lawrence, of the Torrance Iron Co., at Green Island.

Bridgeford & Co. have decided to rebuild their stove foundry at Louisville, Ky., which was recently destroyed by fire.

The business formerly carried on at Toronto, Ont., under the name of the Doty Engine Works Co., and the John Doty Engine Co., (Limited), will henceforth be known as the Bertram Engine Works Co.

The Harrison Agricultural Works, (Limited), has been incorporated at Harrison. The company has a capital stock of $10,000, and will manufacture agricultural implements. J. A. Beard can give information.

## The Fire Fiend.

The iron foundry of Fred. A. Thomas & Co., at Woonsocket, R. I., was destroyed by fire November 16. Loss, $4,500, covered by insurance.

The foundry of Daniel T. Kelly & Sons, Portland, Me., was destroyed by fire November 4. Loss, $5,000.

The foundry and machine shop of E. C. Wehrefritz, at Little Rock, Ark., were totally destroyed November 2. Cause, incendiary; loss, $40,000; insurance, $6,200.

The Ohio Brass and Iron Foundry, at Cleveland, O., was totally destroyed by fire November 23. Loss, $20,000, and 100 men thrown out of employment.

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The December *St. Nicholas* is a beautiful book. It has a new cover, has been greatly enlarged and contains a remarkable program of attractions. Rudyard Kipling's story, "Foomar of the Elephants," is one of Mr. Kipling's greatest efforts.

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The most striking peculiarity of Constantinople is the immense vitality which has carried it through so many deaths. It is common to speak of Turkey as the "sick man," and to associate ideas of ruin and decay with one of the most intensely living cities in the world. But

no one who has spent even twenty-four hours on either side of the Golden Horn could ever conceive of anything even distantly approaching to stagnation in the streets of Stamboul, or on Galata Bridge, or in the busy quarters of Galata itself, or of Pera above. Coming from Europe, whether from Italy or Austria, one is forcibly struck by the universal life, liveliness, and activity of the capital. There is no city in the world where so many different types of humanity meet and jostle each other and the stranger at every turn. Every nation in Europe is represented, and every nation of Asia as well.—From "Constantinople," by F. MARION CRAWFORD, in the Christmas number (December) of *Scribner's Magazine.*

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## Lewis Miller.

IT sometimes happens that the noblest encomuims that can be paid to our free institutions is the plain and simple narration of the life of a self-made man. In no other country, and at no other era in the world's history, have wisely-planned effort, energy and ability been so sure of merited reward as in America during the century which is now nearing its end.

It may be that events and inventions and changed conditions will hereafter considerably limit the number of those who, from poverty and humble life, can reach to wealth and power.

A great deal of speculation is rife as to the probable results of recent economic phenomena, but the brief sketch which is here proposed has to do only with conditions which had to be met and combatted during the half century that has just passed into history.

Hon. Lewis Miller, of Akron, Ohio, is best known to the world as an inventor, manufacturer, and the friend of education. The circumstances and time of his coming upon the stage of action afforded him very slender opportunities. His parents were neither poor nor rich. They lived on a farm, and were well to do. His father was a type of rugged manhood, strong in purpose, and a leader in home affairs, in church, and in whatsoever had in it the promise of benefit to his fellow men.

At the date of Lewis's birth, in the year 1829, the village of Greentown, Stark County, Ohio, offered educational privileges of an exceedingly modest character. The three months winter schooling rarely carried its pupils to a higher plane of science than the "rule of three." He fortified his youthful acquisition by special efforts, as the wide-awake young men of that day were compelled to do. His success in life can, therefore, be attributed, not so much to educational opportunities, as to rare mechanical insight, and the steadfastness of purpose which tolerates no obstacle, and no thought of failure.

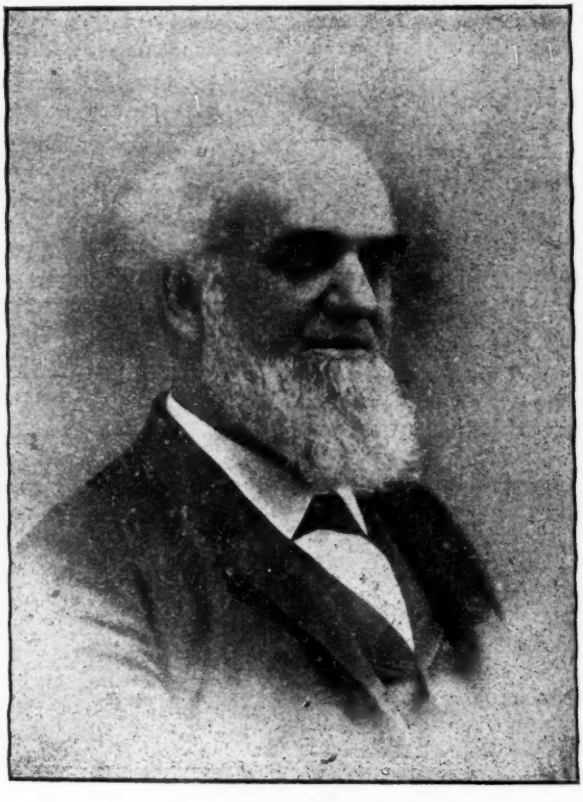
In the prosecution of his farming operations, his father was keenly alive to the advantages to be gained by the use of labor-saving devices. Rude and heavy they were in that day; but a step in advance of sickle and scythe had been made even then. In these devices, especially such as appertained to harvesting, young Miller took a deep interest. Even while he followed the plow, and wearily swung the scythe and cradle, his mind busied itself with the question which he saw must soon be uppermost: "How shall these heavy tasks be transferred from man to horse?" This was a part, and a most important part, of the education of all the great chiefs of farm machine manufacturing industries. No careful technical training in the schools could take the place of these hard, back-breaking labors in the hot days, over the rough, plowed ground. The task of the machine, and the ever varying conditions of ground and crop under which that task must be accomplished, were thus learned, and well learned.

In 1856 he invented the "Buckeye." A small foundry had been built in which he, in partnership with several others, had made plows, spinning-wheels, and a few of the Old Hussy reapers. It was on the rough benches of this little shop that young Miller worked out problems that were to revolutionize harvesting in America. There, for the first time in the world, was drafted a mower with two driving wheels having a hinged bar, and

cutters placed in front of the machine.

The grand cababilities of the harvesting machines of the present day are due to no single year, nor to the efforts of any one individual. The evolution was slow. Its upward and jagged path shows how painful its ascent has been. It is strewed with wrecked fortunes. One of the earliest upon which capricious fortune deigned to smile was the Buckeye. First, because it at once popularized itself with farmers as no machine had previously been able to do; and, second, because of its prominent features; for, thereafter farmers were not satisfied with any machine of this class unless it had the two wheels and a flexible bar.

The fight against the Buckeye's front cutters was long, but a glance at the mowers now in the market will show how hot it has ended. Certainly no harvesting machine is better known around the whole earth than the Buckeye. It is the synonym of that which is swift in execution, sure in operation and perfect in equipment. There is not a region where grass is cut, or grain is harvested, in which the Buckeye is not conceded a foremost place among the most formidable competitors. It was in the conception of this implement, in all its varied forms, and the arrangement of the immense industries employed in its construction, that Mr. Miller has chiefly gained his fame as an inventor and manufacturer.



LEWIS MILLER

The range of his business activities is, however, by no means confined to the construction of harvesting machines. He is the president of the thresher and engine works of C. Aultman & Co., of Canton, Ohio; also of the

Akron Iron Company, and has a place in the directory of a number of other establishments.

Naturally he takes the greatest pride in his first love, the great Buckeye Works, which are under his own personal supervision Notwithstanding the important services he has been able to render in the development of agricultural resources, he has found time for many other things. He has been an extensive traveler both in America and foreign lands, and his favorite fields of effort, outside of his mechanical pursuits, appertain to the domain of Education. The simple enumeration of the stations he has been chosen to fill suggests the wide range in which his active life has made itself felt for the promotion of institutions which bless mankind. A whole book, for example, might be written upon the vast influence and extension of the Chautaqua idea. Mr. Miller was one of the founders of that institution, has always been known as its foremost patron, and he has been the President of the Chautauqua Assembly from its first organization to the present time. He is one of the largest donors to the endowment fund of Mount Union College, and has for many years been the President of the Board of Trustees.

He has been a member, and an active member, of the School Board of his city for a number of years, has for thirty years been superintendent of a Sunday School that has been regarded as the most successful model of its kind; has been a delegate and a prominent participant in all the sessions of the International Sunday School Conventions, and at the tri-ennial session of that organization, at St. Louis, Mo., in June last, he was elected its President, and has been a delegate to all sessions of the General Conference of the M. E. Church for several years,

His selection to positions of the character above indicated, naturally and rightfully implies that Mr. Miller is a man of goodly presence, who has at heart especially the wellfare of the youth of the country, and, moreover, a man who is well at home in the midst of popular assemblages. He was by special invitation a participant in several of the World's Fair Congresses last summer at Chicago, and notably that of the inventors, where he delivered an address on "The Relations of Invention to Agriculture," which was received with marks of extraordinary favor.

Mr. Miller was married in 1853 to Mary V. Alexander. Eleven children have blessed their union, ten of whom are still living. One daughter is the wife of Edison, the electrician. A notice as restricted as this must necessarily be, and that is at best capable of only very partial justice to such a character and career, cannot venture further comment on Mr. Miller's relations as a citizen and householder. And yet, as may well be supposed, it is in this more domestic field that his virtues reflect upon him with the greatest honor.

Himself the most modest of men, he is strong in his own convictions, and in his vindication of the same right for others. He is also strong in his sympathies. Every public benefaction heads instinctively for his earliest cooperation.

Church and college spires stand out, like exclamation points, as the tokons of his munificence. Himself a toiler, whose labors have borne fruit in the discovery of processes of immeasurable value in the increased production of our national sources of wealth, he has never ceased to take a profound and practical interest in whatsoever has tended to promote the happiness and welfare of his fellow men.

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The Connersville Blower Co. report that they were granted an award on the blower they had on exhibition at the World's Fair and under circumstances that it is claimed that render the award one of particular value and significance.

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I have been a subscriber for THE FOUNDRY since its first issue and am very much pleased with it. It is well worth the subscription price to any man interested in the foundry business. My best wishes for its future welfare.

GEO. CROTTY,
Batavia, Ill.

## A Modern Power Crane.

THE accompanying cut is made from a photograph of a part of the interior of the Globe Iron Works, Cleveland, O., is intended to illustrate the large 20-ton power crane built for that concern by the Phoenix Iron Works Co., of that city. The crane is complete in every detail, and is without doubt a masterpiece as a sample of crane construction. It is designed with a view of having everything solid and substantial and at the same time as simple as possible, and thus keep causes for accidents and delays at a minimum. In this case the expectations of its builders have very evidently been fully gratified, as witness the following letter:

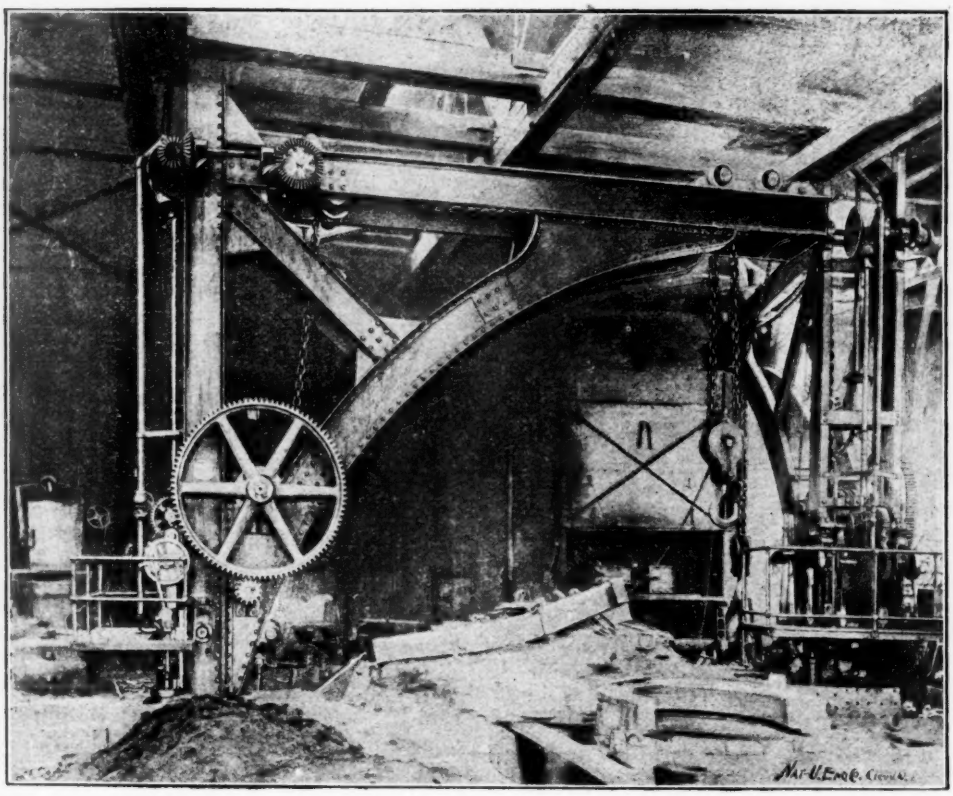
The Globe Iron Works Co.,
Cleveland, O.

The Phoenix Iron Works Co., City.

Gentlemen: In answer to your inquiry regarding the 20-ton crane, we have to say we have tested it and found it does all you claimed for it and gives every satisfaction. Yours truly,

The Globe Iron Works Co.
J. F. PANKHURST, General Manager.

We are also advised that this company received an order last week for seven cranes similar to the above from the Akron Skein Forge Co., of Elwood, Ind.



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A cylinder for a large turbine pump was successfully cast at the foundry of Byron Jackson, in San Francisco, Cal., November 24. It weighed five tons and is said to be for the largest pump of its kind in the world.

David O. Holmes, the first man to establish an iron foundry in Adams, N, Y., was buried there November 8.

Wm. Campbell, Sr., of the firm of J. G. & Wm. Campbell, foundrymen at Butler, Pa., died November 17.

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## That Center-Blast Cupola.

Editor THE FOUNDRY:

Since the last issue of THE FOUNDRY, citing your discovery of an old patent on a center-blast cupola, I have seen a copy of Mr B. H. Hibler's patent on same and entitled an "Improved tuyere for blast furnace, etc." No. 67651, issued August 13, 1867. I am now satisfied that had I desired to have followed Hon. Ellis Spear's advice after his examination, I could have obtained a patent on my center blast device, as presented to the Western Foundrymen's Association. For its principle or construction to accomplish the end is an improvement and wholly different in plan and design to that presented by Mr. Hibler. I concede to him, however, the credit of first conceiving the idea of a "center blast," as far as my knowledge now goes, but I do not think his plan to accomplish such and achieve the best results, to be very practical. For in my experiments in working up to the device I presented I tried a plan very similar. The impression I formed of Mr. Hibler's patent from the description first received before obtaining a copy of his patent, was that the blast pipe came up through the "drop doors" and rested on same, as shown in my device. Instead of such, his patent drawing shows it simply to be a prolongation of an outside tuyere turned up at about the center of the cupola with a cap or top projection to prevent the melting iron dropping into the openings admitting the blast to accomplish the end illustrated by the cap K, seen in my device. His protruding tuyere, one might say, is just the same as if one would take a right angle elbow pipe with prickers cast on it, the long end projecting into an outside tuyere and the turned up end cast, having a projecting flange, and which also closes up the end of the tuyere or pipe and under this flange there being openings for the admittance of the blast; the whole being daubed over with a lining of fire clay or refractory material. While Hibler's device is very simple, my experiments would lead me to say that its position and plan would be detrimental to preserving intact its lining from being knocked off by the manipulation in preparing and charging the fuel and iron, and in the second place, it could not save the fuel my device can, for the simple reason that its bulk does not occupy or fill up so much space below the tuyeres, or bottom portion which, in cupolas for foundry purposes can to a great degree be called a dead factor for gaining any economy as far as the fuel is concerned. For no matter how high tuyeres are, you have to fill up above them with coke from 18 to 30 inches, and with coal from 12 to 20 inches, it depending of course upon the quality of fuel, kind of iron and weight of the heat to be "run off." And in the third place, his device is such that when a bottom is dropped, it remains in, or is a fixture in a cupola and greatly retards its dropping or make it "hang up," whereas mine, laying on the "drop doors," comes down with the "dump," bringing with it all the refuse, and in ordinary heats leaving a cupola almost in shape to again put the "drop doors" and go ahead with another heat. Then again I think that I am entitled to some credit in this "center-blast" idea or question, for I feel sure that I have carried it much farther and perfected it more than any one as yet proved such to have been done. Mr. Hibler's patent calls for a "center blast" only, and condemns the use of outside tuyeres altogether. The many experiments I carried on with this "center blast" principle proved to me that it was far more economical to use the same in connection with outside tuyeres, also to have the "center blast" opening, S, as seen in my illustration, higher than outside tuyeres, so as to accomplish the end of admitting more air or oxygen to combine with the carbon oxide gas created from the lower fuel in passing up to a level with the "center tuyer" and turn the carbon oxide into carbonic acid gas, therein creating greater or more perfect combustion. Anyone interested in this subject can find additional matter pertaining to same in the *American Machinist* of November 30, 1893, and which mainly relates to the construction of, and how best to obtain such a device as presented by the writer before the Western Foundrymen's Association, October 18, 1892. THOS. D. WEST.

Dec. 4, 1893.